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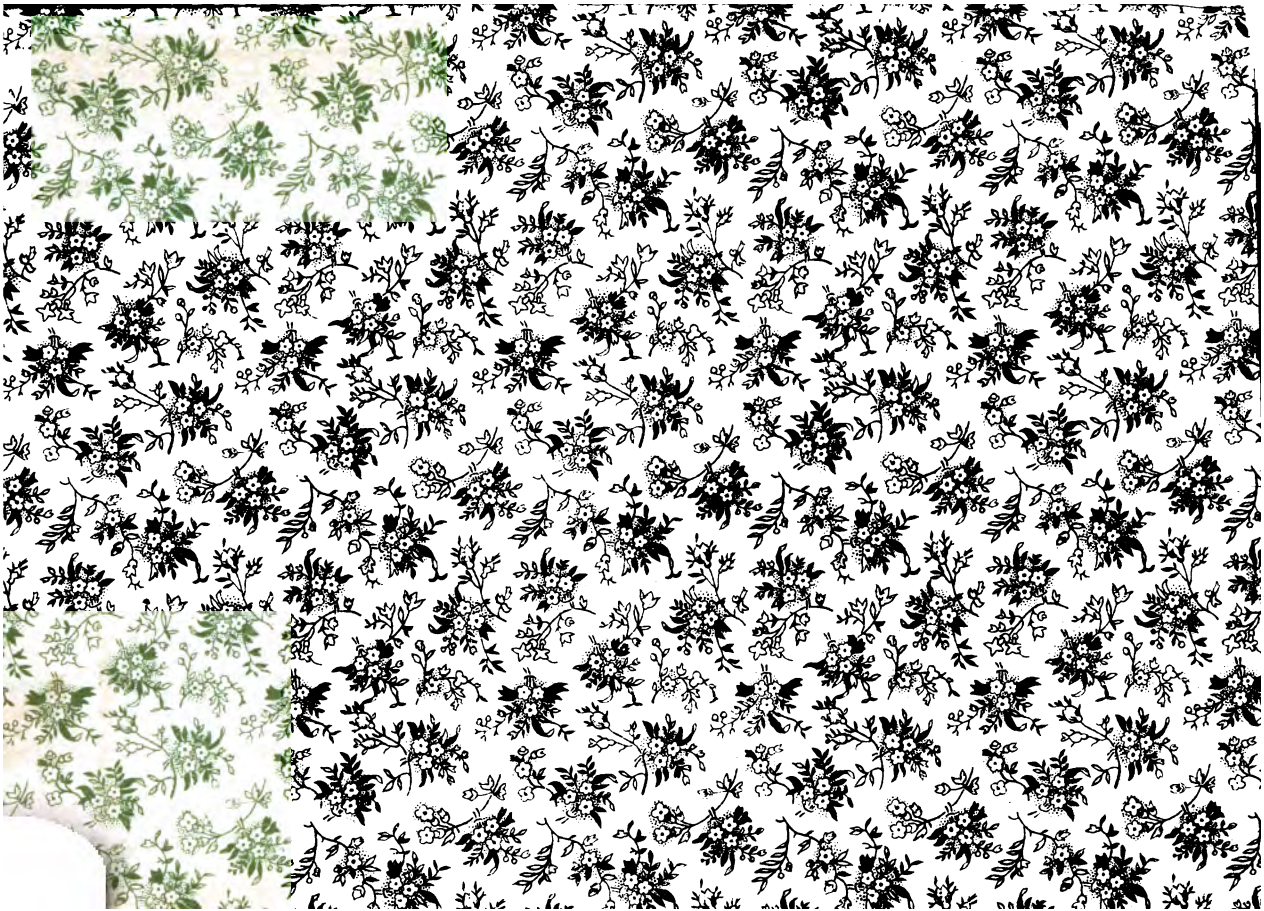

TACTICAL ORGANIZATION AND USES OF MACHINE GUNS IN THE FIELD.

By JOHN H. PARKER,
1ST LIEUTENANT, 13TH INFANTRY.

Commander of Machine Guns in the Santiago Campaign: Author of "The Gatlings at Santiago," "Lessons of the Spanish-American War," "Notes on Our Military Organization," Etc.

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Dedication.

TO THE ILLUSTRIOUS OFFICER
WHOSE FORESIGHT AND GOOD JUDGMENT AFFORDED THE OPPORTUNITY FOR
THE FIRST OFFENSIVE USE OF THE NEW ARM, AND
WHOSE ACUTE GRASP OF THE NECESSITIES OF ITS EMPLOYMENT AFFORDED THAT INDEPENDENCE OF
ACTION NECESSARY TO ITS SUCCESSFUL USE; AS
WELL AS TO THAT COURAGEOUS SOLDIER
AND GENTLEMAN WHO FOLLOWED ITS
FORTUNES AND SHARED ITS DANGERS, REPORTING FAITHFULLY ITS SUCCESSES
AND FAILURES;

TO

MAJ. GEN. W. R. SHAFTER, U. S. ARMY,

AND TO

FIRST-LIEUT. HENRY MARCOTTE, U. S. ARMY,
(RETIRED)

THIS VOLUME IS RESPECTFULLY AND
GRATEFULLY DEDICATED
BY THE AUTHOR.

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CHAPTER I.

INTRODUCTION.

The machine gun has become a permanent factor in the military tactics of the future. The place it is to occupy in the military world is still to be determined, except that it is acknowledged that the machine gun will constitute a powerful addition to the armament of nations. It is the most recent development of inventive genius as applied to the military art, and has until recently been considered as an undemonstrated thing in warfare. It has at last taken the position of a well-demonstrated weapon whose capabilities and powers are as well defined and as thoroughly understood as those of the field-piece or the infantry rifle. The next problem is to determine its tactical place, organization, and uses. Then, in this country, remains the problem of forcing recognition of the merits of the new weapon, and necessity for its proper status, upon a reluctant Congress and public.

There have not been lacking students of the subject among the most distinguished exponents of the military art. These have advanced various views, more or less in the realm of pure conjecture, as to the future developments of the arm, and some of these will bear quotation to show the trend of thought among the best thinkers on this subject.

Lord Wolseley said in 1886: "If made use of intelligently upon active service, the machine gun of infantry rifle caliber that will fire with smokeless powder and be sighted up to 3000 yards will mark a new era as pronounced as that when rifle or when breech-loading small arms were first adopted."

The gun thus described is now an accomplished fact, and has been used in battle. It is this weapon that we are to consider. But we must have more than the mere gun; we must have it mounted so that it can be moved. *(a)* By draft, wherever draft is practicable. *(b)* By pack, wherever the pack is desirable. *(c)* By hand, with perfect facility, and by one or two men, over any kind of ground.

It will not be a factor in warfare to be seri-

ously considered until all of these conditions are complied with. Luckily the gun is so light that it requires a very small stretch of inventive genius to fulfill them all. It is merely a question of a suitable carriage, and the tangent spoke and ball-bearing have been applied to the problem in so practical a manner that this part of the question can be neglected in the discussion. The new carriage is truly a universal mount, adapted to the service of all forms of the machine gun, under all conditions of the service. It is equally as perfect in its sphere as the machine gun is in its way. In the following pages, therefore, the machine gun will be considered as mounted in a manner to fulfill all the requirements of its service. The idea will be that it can be taken wherever an infantry soldier can go, with all the rapidity of the best cavalry. Its effective range will be taken as 2500 yards, though the machine gun can be used at any range where infantry fire is effective, and at ranges from 300 to 600 yards beyond effective infantry fire. It may also be noted that it is the most effective of all arms at the shorter ranges, and that the ammunition supply is a problem that has been found to solve itself on the battle-field.

In passing it might be said that the same inventor who has solved the carriage problem has also solved the ammunition problem. It has been found that the presence of the machine guns aids the distribution of ammunition to the infantry firing-line, instead of complicating that question.

Major Anderson, R.H.A., said before the Royal Military Service Institution, January 21, 1887: "Just as certainly as the needle-gun gave to the Prussians a decided advantage in the campaign of 1866, so will an intelligent and bold use of machine guns operate in favor of the nation that first utilizes them in a future campaign. The terrific power developed by these weapons effectually silences all detraction from their value as implements of war, while military writers speak of them with respect, but remark that some solution as to their efficient use and adaptation to the field of tactics at the present day is necessary."

Captain Charles E. Callwell, R.A., in a prize essay of the Royal Military Service Institution, 1886, says: "If those interested in the question of machine guns would endeavor to create a form of the weapon that could with ease be carried by two men or on a horse, that could be relied upon

not to collapse from mechanical defects at a moment of crisis, that could act as an auxiliary to infantry and cavalry under all circumstances without being a burden, their efforts might produce a mitrailleuse capable of moulding the tactics of the future as the breech-loader has moulded the tactics of the present."

The gun required by the essay of Callwell has been produced; and the present book is an attempt to solve the additional problems presented by him and by Wolseley and Anderson. We have therefore to inquire how the arm should be organized, how and where it should be used, alone and in conjunction with the other arms, both on the defensive and the offensive, and what kind of training should be given to those who are to operate the new arm under all conditions. This will necessitate an inquiry into the history of the weapon in its different forms, and a careful analysis of the problem from all standpoints. From the historical discussion will be developed some important points in regard to the capacities and uses of the weapon, as well as in regard to the various forms of organization which have obtained in the different services of the world. After this discussion

will arise the problem of the best form of organization, in view of the latest demonstrations of the weapon, with a complete solution of this part of the subject on the lines of a logical deduction from the premises so obtained. This leads up to the functions and tactical employment of the machine gun when so organized, used with troops acting on the offensive. This part of the subject resolves itself into the uses of the gun with advance guards, outposts, patrols, and in battle. Following this naturally comes a treatment of the weapon thus organized on the defensive for an army in the field.

We are then to consider the proper training of the man behind the gun, both enlisted and commissioned. Without some kind of training, it will be useless to expect the best results. Results do not happen; they must be planned for, and this involves study on the part of the officers, and training for both officers and men. Following this part of the subjert will be a forecast of the effect of such introduction of a new factor on the battlefield, on the tactics of the other arms of the service. This must be purely speculative, of course, except in so far as it has been demonstrated by

experience. But it is none the less a necessary part of the subject. That the new factor will exercise an important bearing on the other arms is already a conceded thing; but the writers are very much at sea in regard to how this new influence will make itself felt. It is necessary to endeavor to draw a lesson in this respect from both theory, experience, and history. The army which can do this first will obtain a great advantage in the next struggle, which may neutralize some deficiency, or exert a preponderating influence upon some engagement of the future.

Captain Gaston Moch utters the following vigorous words on the subject of timely adoption: "When the time comes in which the change of armament must be made, it will evidently be too late to begin studies which are the work of years: so soon as such a step is decided upon in principle, the time for construction is at hand. It would not be enough then to merely have these studies in hand. In such a case we run the great danger of hurrying the issue under the stress of need. In the points which require clearing up we must content ourselves with a solution similar to that which existed in the condemned

system or in some other like it. The final result is a hybrid creation, on which ere long much time and money will be spent in changes." It is in the hope of preventing these last words from being true of our own country that this book is written. It is the result of years of hard study of the subject, and of the broadest experience ever had by any man of the use of machine guns in the exigencies of an active campaign, including their practical test under all the conditions of modern battle. With this preface, the book is submitted to an intelligent and discriminating public strictly on its merits, with the hope that it will be found of some value as clearing up some doubtful points in regard to machine guns, and of some use to the student of tactics.

CHAPTER II.

HISTORICAL SUMMARY.

The machine gun occupies the unique place of being the latest and most powerful development of mechanical ingenuity applied to the military art. It is entirely modern. There is no record of any attempt to use similar weapons before the Franco-Prussian War, begun in 1870. Since that time some form of machine gun has been more or less used in all the principal armies of the world, but no country adopted a definitive organization for them until after the American-Spanish War, in which machine guns were first used successfully for the tactical offensive, and demonstrated beyond doubt their general utility in a campaign.

THE FRANCO-PRUSSIAN WAR.

Some years before the Franco-Prussian War, a breech-loading, volley machine gun, using paper cartridges, and firing small-arm ammunition, had

been invented and brought to the notice of the French military authorities. This was the Reyffe mitrailleuse. Previous to the use of breech-loading rifles such a gun would have been impossible; but after the breech-loader the next development of small-arms was in the direction of mechanical concentration of fire. The caliber of the mitrailleuse was large, as such things are now measured, but the machine worked well. Its effective range did not exceed 400 yards, and its rapidity of fire was very much inferior to that of the machine guns now in use It was adopted by the French and organized as a part of the light artillery of the Empire. This did not occur until it was too late to instruct any considerable number of men well in its use; its true tactical value does not appear to have been understood by either side in this war. Great hopes were based on its fire-action, however, and these were not wholly disapppointed, as the history of the war abundantly shows.

This war has so often been quoted as an argument against the use of machine guns that it seems like a heresy to attempt to derive any lessons from it favorable to their use. The Germans

had no such gun, and though they captured many from the French, they made no attempt to use them. It is quite the custom in any war to decry the methods of the vanquished party, and to seek all constructive lessons from the victor. Most of the text-writers on this war quote from and copy the German accounts and methods. Yet from even this prejudiced source it is quite possible to deduce that the mitrailleuse played a very important part in this, the first war in which machine guns were ever used.

At the battle of Gravelotte several batteries of mitrailleuses were placed on advantageous ground in the vicinity of the St. Hubert farm, and the first efforts of the Germans against this part of the French line were met by fearfully destructive fire from them. General Sheridan, an eye-witness, testifies to the efficacy of the machine-gun fire at this part of the line. He states that the mitrailleuse fire was apparently silenced by the German light batteries, and that the infantry battalions crowded forward to the assault expecting an easy victory. Before contact, however, they were met by such a storm of fire from the French line, aided by the mitrailleuse, that the whole Ger-

man line was disorganized and the charge swept back into the ravine in front of the farm-house, toward Gravelotte.

Speaking of the opening of the artillery duel, Sheridan says: "The French artillery and mitrailleuses responded vigorously to the Krupps, and with deadly effect." He then goes on to tell how the French fire was slackened under the artillery fire of the Germans, saying: "Their artillery was silent, however, and from this fact the German artillery officers grew jubilant, confidently asserting that their Krupp guns had dismounted the French batteries, and knocked their mitrailleuses to pieces. I did not indulge in this confidence, however, for, with the excellent field-glasses that I had, I could distinctly see long columns of French troops moving toward their right, for the apparent purpose of making a vigorous fight on that flank, and I thought it more likely that their artillery would be heard from before the Germans could gain the coveted ridge.

"The Germans labored slowly up the glacis at the most exposed places, now crawling on their bellies, now creeping on hands and knees, but, in the main, moving with erect and steady bearing.

As they approached within short range they suddenly found that the French artillery and mitrailleuses had by no means been silenced—about 200 pieces opening upon them with fearful effect, while, at the same time, the whole crest blazed with a deadly fire from the Chassepôt rifles. Resistance like this was so unexpected by the Germans that it dismayed them; and, first wavering a moment, then becoming panic-stricken, they broke and fled, infantry, cavalry, and artillery coming down the slope without any pretence of formation, the French hotly pursuing."

There can be no doubt that the French had used the old stratagem of withholding their fire in order to deceive the enemy, and that the machine guns played an important part in the result, imperfect as they were at that time.

The German Official Account of this engagement says: "A mitrailleuse battery appears more especially to have been posted exactly in prolongation of the Gravelotte high-road, and to have commanded it in the most effective manner." Captain G. E. Benson, R.A., says of this: "From this it may be presumed that the mitrailleuse battery in question was, to a considerable extent, responsi-

ble for the disastrous ending of the German attempt to debouch from the road across the Mance ravine."

It is a well-known fact that this part of the French line was never carried by assault. Sheridan says: "It was plain to see, from the good shape in which the French left wing had retired to Metz, that its retreat had been predetermined by the disasters to the right wing."

The right wing of the French Army had no effective mitrailleuses, which may in some degree account for the disasters at St. Privat. Benson says: "At St. Privat, also, though the French guard arrived too late to restore the battle, mitrailleuses might have arrived in time if handled with boldness."

But this was not the only place in the battle where the victorious Germans felt the weight of the machine-gun fire. Quoting again from the German Official Account, action of the Ninth Corps: "The artillery upon the spur south of the Bois de la Cusse was at this time in a very precarious position. A mitrailleuse battery had come into action at the most effective range, opposite the left flank of the Prussian line of guns. The

Fourth Heavy Battery in that neighborhood, which had already sustained heavy loss from infantry fire, was in a few minutes so damaged by the mitrailleuse fire that several officers, five gun commanders, and forty men were placed *hors de combat*, while nearly all the horses were killed or wounded." Benson says of this: "The further result of this was that four guns fell into the hands of the enemy. This, then, is a remarkable instance of what the mitrailleuse could do when rightly handled."

The Germans mention other places where this weapon was well used. Quoting from the German Official Account of the action of the 38th Prussian Infantry Brigade at Mars la Tour: "The brave battalions are forced to fall back into the valley beneath, and the fire of the adversaries *from mitrailleuses advancing to the crest increases the losses almost to annihilation.* Cavalry were then pushed forward by the Prussians to protect the shattered remnant, but *in consequence of the violent mitrailleuse fire* the leader was unable to deliver home his attack." The losses of the Germans here were given in *Colburn's United Service Magazine*, October, 1881, as follows: Total engaged, 95 officers, 4546

men. Losses, 72 officers, 2542 men, killed, wounded, and missing. "The proportion of killed to wounded being as 3 to 4." This was not a bad maiden attempt for machine guns.

Lieutenant W. E. Birkhimer, United States Artillery, says in the *Journal of the Military Service Institution*, November, 1893: "The French brought the mitrailleuses into the field in 1870, and it seems they expected the guns would play an important part. They did not, however, and their failure has perhaps unjustly disparaged the machine guns. But this failure must not be counted against the system for more than it is worth. The French mitrailleuse was, as compared with the machine guns of the present day, a crude affair. It used paper cartridges, was clumsy to handle, consisting of 25 barrels arranged in 5 tiers of 5 barrels each, and, what was perhaps of as great importance, the army was not familiar enough with them to know how to use them. What would have been the result if these guns had been pitted against a less thoroughly prepared army than the Germans, it is impossible to state."

But we have already seen that the Germans

themselves were far from despising them, after they had come in contact with them on the battle-field a few times, and that the German Official Accounts are full of instances of their effective and deadly use. Are these observations true of the French artillery? The Germans seem to have almost totally disregarded that part of the French Army all through the war. It was, with few exceptions, entirely inefficient. Wagner says of the French artillery: "From the beginning of the campaign the French artillery was outnumbered, outmaneuvered, and outfought." "The proportion of mitrailleuse batteries to field batteries was 1 to 3."

Lieutenant Pratt, R.A., says in *Colburn's United Service Magazine*, October, 1894: "At Gravelotte, when taking the offensive, 94 per cent of the German killed and wounded were due to mitrailleuse and small-arm fire, and but 5 per cent to artillery fire." Captain G. E. Benson, R.A., says, March, 1891: "Yet, even with such mitrailleuses as they possessed, they produced 5 per cent of the Prussian losses." This was in giving a summary of the utility of the French machine guns during the war. Surely the French artillery never was used bet-

ter, according to all accounts, in any place in the war than at Gravelotte, where it is credited with 5 per cent. We therefore come to the logical conclusion that this new weapon produced as much loss to the enemy as the artillery proper, although the army had not been instructed in its use, according to Birkhimer, and according to Wagner its numbers were to the artillery as 1 to 3.

Those who speak so disparagingly of the French use of machine guns have done so, therefore, without proper study of the subject. We would not expect the victorious Germans to adopt the tactics and arms of their defeated adversaries, but we might expect in our own service a little more careful study of a subject and a little more careful comparison of the records before final judgment is passed upon the machine gun and it is condemned on the basis of its use in the Franco-Prussian War. Critical study and comparison of the records show that the French machine-gun service was highly creditable in every way; had the other parts of their army been used as effectively as the mitrailleuse was used, the war would probably have had a different termination.

This idea is supported by many other instances

where the mitrailleuse was successfully used. Captain F. Gleadowe Stone, R.A., makes the following observation on the battle of Wörth in "Tactical Studies of the Franco-Prussian War": "The mitrailleuse batteries, of which such great things had been expected, were badly posted and easily put out of action by the German field-guns; in fact, the new invention had been kept such a profound secret that the officers in charge of the mitrailleuse batteries seem not to have understood the purposes to which the new machine gun was applicable, and, in pitting it against the German field-guns at long ranges, simply courted failure." He says of the battle of Sedan, however, speaking of the right wing of the German Twelfth Corps: "To oppose this movement the Saxons had deployed along the road, leading past the west of the Bois Chevalier towards Villers Cernay; a vigorous musketry action shortly became general along the whole line. The French brought up artillery and mitrailleuses on their right; the Saxon batteries were also severely dealt with by the French tirailleurs at a range of less than 500 yards. *Matters were becoming serious for the Saxons* * * * * * * when reinforcements began to arrive

upon both flanks and the advance guard of the Guard Corps appeared from the direction of Villers Cernay." It appears that the mitrailleuse batteries were used to good effect in the battle of Sedan at this point, notwithstanding the tremendous superiority of the German artillery.

The following account of how a mitrailleuse battery was silenced by the German artillery will give some idea of the superiority of the latter. The account is by the same author and relates to the battle of Wörth, near the Dieffenbach-Wörth road at 9:30 a. m. "The French artillery (mitrailleuse) was from 2400 to 4000 paces distant on the opposite slope. The *24 guns* of the advance guard of the Eleventh German Corps, northwest of Bunstett, opened fire at 10 a. m. in *conjunction with 84 guns* of the Fifth Corps, and immediately compelled the mitrailleuses to withdraw out of action. * * * * * * * * * The whole line of French guns was shortly reduced to silence." This is hardly to be wondered at, when the mitrailleuses were not supported by effective artillery, and, having an effective range of only 400 yards, were pitted against 108 field-pieces at from 2500 to 4000 paces.

Major Charles Brackenbury, of the English

Service, stated April 19, 1875: "I can vouch for the fact that the German soldiers held the French mitrailleuses—unwisely used as they were—in more dread than the French artillery."

Rogers says: "To destroy mitrailleuses seemed to be a favorite and not unnatural pastime of the overwhelming and well-directed Prussian artillery; but surely this fact indicates the measure of their respect for the weapon and is a strong argument in its favor, for, as Colonel Hamley enjoins, 'guns should bear on that arm which threatens most.'"

Summing up the use of machine guns in the Franco-Prussian War, it may be said that the French were defeated in the campaign, not because they used machine guns, but because they blundered in every other possible way. Their artillery was inefficient, their cavalry worthless, and their generalship conspicuous by its absence. Powerful as the imperfect mitrailleuse was, it was unable to rescue the doomed nation from the fate it had prepared for itself by gross military incompetence in every other part of the war.

The French had made the great tactical blunder of supposing that their mitrailleuse could sup-

plant artillery. They had therefore organized it into batteries as artillery, and endeavored to use it against artillery at the effective ranges of the latter. The German artillery was highly effective at the range of 4000 paces; it was claimed that the mitrailleuse was effective at 1000 paces, but there is no record of its truly effective use at any range beyond 500 yards, and, as a rule, it was not really effective at ranges exceeding 400 yards. The Prussian artillery was therefore able, from positions far beyond the mitrailleuse range, to carry out their instructions, which were as follows: "Never mind what else you do, but as long as you see the mitrailleuse battery devote your attention to it." (Lord Charles Beresford.) The machine guns thus rarely got a chance at effective ranges, owing to the defectiveness and inferiority of the French artillery; and when it did get a chance, it may be seen from the above citations, which are only a few of the many that might be made, how effectively the mitrailleuse performed its work.

The mitrailleuse was strictly a volley gun. Whether it consisted of 37 barrels, as Wagner says, or of 25, as Birkhimer and the English authorities

have it, is a matter of little importance. At its best rate of speed the gun could be loaded and discharged only five times per minute, giving a volley fire not to exceed 125 to 150 shots per minute per gun. It was complicated; its mobility was not superior to that of the field artillery of the day, and much inferior to that of the present day. The dirigibility of its fire was not superior to that of a field-piece, and it had not *continuity* of fire. These were two of the gravest faults of its construction. It could not be used to produce a sweeping fire at all—such a fire as might be likened to the action of a stream of water from a hose was as impossible to it as to a field-piece. Like the field-piece, it had to be relaid after each discharge. Its effective strength could hardly have exceeded that of 10 riflemen, yet it mowed down great swaths of the enemy, opened wide gaps in his formations, and produced a tremendous moral effect.

The deductions drawn from this war have been strangely at variance with the facts on which they were based. This was perhaps natural, as most of the tacticians based their conclusions on the accounts of the victors, and followed them in their deductions. The Germans pointed with pardon-

able pride to the destructive fire of their artillery, and to its superiority over that of their antagonists. The deduction they made was that machine guns are valueless when they are opposed by good artillery. It was overlooked that in this war the two arms were not evenly matched; that the weight of metal and rapidity of fire of the machine guns were unequal to the contest, their bullets too small to injure the artillery *matériel*, while *their range was not great enough to injure its personnel.* If the German artillery had been opposed by equal artillery, they would have been compelled to devote their attention to it instead of to the machine guns; the latter would have then met the German infantry with a fire much superior to that finally brought to bear, and it may well be doubted whether the German infantry would have been able to make the triumphant showing it did.

The deduction that the artillery was at that time superior to the machine guns was no doubt correct; but it was manifestly incorrect to go beyond this by saying that the artillery would always remain so, and that the battle-field holds no place for machine guns on the offensive. The essential fact remained that the French were able, notwith-

standing the superiority of the artillery in point of range, with the help of machine guns, to hold positions against desperate assaults, well supported by overwhelming artillery fire, until flanked out, as in the case at Gravelotte. The conclusion should have been that machine guns, as then developed and organized, were inadequate to the complete defense of a position when attacked by masses of artillery and heavy swarms of skirmishers, unless adequately supported by a suitable amount of artillery proper.

The use of machine guns, notwithstanding the great improvements made in them, received a severe blow from the erroneous conclusions drawn from *ex parte* statements of this war. Various wars of minor importance followed, in some of which they were used to a greater or less extent, but in none of which they played a part of commanding importance. They were used in savage warfare by several countries with good results, but all nations waited for the test of civilized war before adopting them as an integral arm of the service. It fell to the lot of the United States to make this test, and it was done so thoroughly that all doubts on the merits of the weapon, as now

improved and used, were effectually set at rest. This test occurred in the Santiago campaign, but before considering it we may as well bring the intermediate history of the arm down to date.

THE BANNOCK-SHOSHONE CAMPAIGN OF 1878.

This campaign afforded one instance of the effective use of the .54 caliber Gatling gun against savages. A band of Bannocks and Shoshones were making a break for the Umatilla Agency, with a view to inducing the Indians at that place to go on the war-path. The 1st United States Cavalry, under Captain (subsequently Colonel) Bernard, went after them to prevent this. The regiment was accompanied by three of these Gatlings. They overhauled the hostiles near the Umatilla Agency, and the latter took refuge on a high bluff, which was commanded by ground equally high to the right. Three troops were dismounted as skirmishers and pushed forward to attack the bluff on which the Indians were lurking. On reaching the foot of the bluff, over an open space of about 600 yards, the skirmishers found themselves in front of a nearly vertical wall, at the top of which the

Indians were lying and from which they began to pour in a most galling fire. The three troops were certain to suffer heavily if they retreated across the open ground, and were unable to climb the bluff in the face of the fire. Just as they were beginning to suffer heavily, the Gatlings opened from the high ground to the right, to which place they had been moved on a run, and the fire from the Indians on the bluff at once ceased. The fight was terminated by the defeat of the Indians, who were struck in flank by another force as they left the bluff. There can be no doubt that these three troops would have suffered very heavily if they had not received the aid of the machine guns. This account of the skirmish is furnished by a participant. It will be observed that this is a typical use of the guns with cavalry, in either Indian or civilized warfare. To gain a flank and pour in a sharp and unexpected fire upon the enemy is usually a decisive maneuver, and one particularly adapted to these guns.

THE SIEGE OF ALEXANDRIA.

The machine guns were again used in the Alexandria campaign, both by the Navy and the Army. The naval use was not very effective, as it was apparently impossible to tell where the bullets were striking; but the land use is described by Lord Beresford as having been of great value. He says: "The Gatlings came in very usefully for the landing, clearing the town of riot and restoring order. It was openly stated by Arabi's officers and men that nothing would induce them to face machines that 'pump lead,' which referred to the Gatlings, with which Captain Fisher held the lines with 370 men during four anxious days and nights. Such was the terror inspired by these guns when used for clearing the streets, that, although there was an army of 9000 men within a short distance, they would not face a small party of 370 men who held the lines with Gatling guns." The tactics used by Captain Fisher to produce this wholesome respect are not described, but it may be surmised that the guns had been more effective during the bombardment than is generally credited.

THE KHIVAN CAMPAIGN.

In the Khivan expedition a battery of two Gatlings was used under command of Captain Litvinoff, of the Russian Army. This battery was used on the offensive against charging bodies of Turcoman cavalry, with perfect success, and with small expenditure of ammunition. Captain Litvinoff describes it as follows: "Two companies of sharpshooters, two companies of the 8th Battalion of the line, and two battery guns (Gatlings) were ordered forward to drive away these bands of Turcomans. The road we had to follow was very difficult, even for infantry and cavalry, as at every step we had to cross wide ditches dug for irrigation, which had abrupt sides. For artillery this road would have been impassable. Our light guns went on this road with perfect ease, the ammunition pack-horses alone giving us some trouble. When we stopped, a line of sharpshooters and battery guns (Gatlings) was formed along one of these ditches. First I had to find out the range. For this purpose I fired three cartridges, changing each time the height of the sight; the distance was betweeen the limits of 1050 and 1170 yards. Open-

ing at the first, I fired rapidly 25 rounds; the band immediately dispersed, part of the band joining the second band. Opening from the second gun, I fired 50 rounds without interruption; the second band dispersed at once, and the men betook themselves to broken ground. Several times the enemy, collecting in masses of strength, moved against us, but was each time driven back by our fire; thus I had several opportunities of giving a succession of 25 or 50 rounds, the direction of the gun and the elevation varying somewhat according to circumstances. In the whole, the battery guns fired that day 408 cartridges."

The Gatlings were also used on the defensive during this campaign to repel a night attack. The same officer gives the following account of it: "The column to which the Gatlings were attached moved forward on one occasion, leaving all its baggage packed in charge of a small detachment provided with two Gatlings. At nightfall it was ascertained that the enemy lurked in large numbers in the vicinity of the camp. Every precaution was taken to prevent surprise. The baggage-wagons were collected into a square, and in a corner formed by the front and right sides the two

Gatlings were placed. At 3:00 o'clock in the morning the attack of the Turcomans commenced. At the first howls of the enemy I hastened to form a cover for my guns. I put on the right wing 10 privates, on the left the 15 sharpshooters and 12 men of my battery guns command, with whom I could dispense for the present. These men were also armed with rifles. Leaving thus with the battery guns only the most indispensable men to assist in firing, I took myself the crank-handle of the first gun, and invited Captain Cachourin to take the handle of the other gun, and enjoined on all my group not to commence the fire before the word of command was given. The guns formed an obtuse angle with each other, as it was necessary to direct them to the precise spot where the shoutings of the enemy were heard, and whence they were approaching us. We had not long to wait. The cries of the Turcomans who had succeeded in breaking through the lines of our detachment and turning their flanks suddenly rose from all sides, and became deafening, Though it was dark, we perceived in front of us the galloping masses of the enemy, with uplifted glittering swords. When they approached us within about 20 paces I shout-

ed the command 'Fire!' This was followed by a salvo of all the men forming the cover, and a continuous simultaneous rattle of the two battery guns. In this roar the cries of the enemy at once became weak and then ceased altogether, vanishing as rapidly as they rose. The firing at once stopped, and, as no enemy was visible, I ventured to get a look at the surrounding ground, availing myself of the first light of dawn. At some distance to the right of our square stood the 8th Battalion of the line. Between it and us, at every step, lay prostrated the dead bodies of the Yonoods."

In this is illustrated a very useful function of the machine gun, possible only by the continuous quality of its fire, and not possible to any other kind of weapon—that of sweeping the front of a position in the darkness, by fire from guns previously laid in daytime.

THE GEOK-TEPE EXPEDITION.

The following instructions given by General Skobeleff in the Geok-Tepe campaign, just before the battles on the 17th of July and 30th of December, 1880, indicate that he had a high estimation of

the machine guns which formed part of his command, and a keen appreciation of their defensive value: "I beg Colonel Verjbitzki to pay particular attention to the value of mitrailleuses [Gatlings] when arranging for the defense of bivouacs, as they produce an irresistible effect." The offensive value of this weapon does not seem to have occurred to him; but what is the offensive, at the present day, except the defense of positions successively occupied toward the front? Why should not a machine gun be as usefully employed to work in this case as on the purely defensive?

The war between Chili and Peru afforded instances of the use of machine guns in both navies with good effect, but no typical instance of their use of either the defense or offense in land-fighting. No conclusions can be drawn from it.

EL OBEID.

At El Obeid the machine guns formed a part of the equipment of Hicks Pasha's army, but in very inadequate numbers, he having only three machine guns. We are forced to rely on the account furnished of this disastrous affair by an Egyptian non-commissioned officer, who escaped by feigning

conversion to the Mahdist faith, and subsequently made his way to Alexandria, where he told the following of the battle. The account is taken from "Decisive Battles Since Waterloo," by Knox:

"They dashed against the right angle and right center [of the square], but the Krupps and the mitrailleuses there made great havoc with them, upon which they wheeled around again and made straight at the right angle of the rear face, where there was only a muzzle-loader. Here they broke into the square."

The disastrous results of this battle were thus directly traceable to the lack of a sufficient number of machine guns. In subsequent campaigns by the English forces in the Soudan this defect has been remedied, notably in the case of Kitchener's recent campaign, to be referred to later. The English have also found these guns of great value in all recent warfare with barbarous tribes, both in Africa and in India.

During the years between 1867, which marks the invention of the Gatling, and 1897, many tests were made on proving-grounds by different countries of various machine guns, under all sorts of conditions. Several varieties of carriages were

tried, but none was devised fulfilling all the requisites of such service. The English adopted a so-called "galloping carriage," which consisted of a cart with shafts, having a limber-chest on which the gun was mounted, and from which it could be fired, either with or without removal of the horse. They also adopted a tripod support, capable of being carried by one or two men. The Mexicans used the tripod support, while the Russians and Americans retained the carriage and limber, requiring the use of four horses. This form of carriage possesses greater stability than any tripod, but sacrifices mobility. It enables a large amount of ammunition to be with each gun, but makes it very doubtful whether, under ordinary conditions, the gun will be able to get into action on the offensive. The results of the campaigns cited above and of the various tests made were that in all countries the merits of the arm as a defensive weapon were generally recognized, but its offensive value remained in doubt.

FIRST SUCCESSFUL OFFENSIVE USE.

At the outbreak of war between the United States and Spain, April 26, 1898, there were about

150 Gatling guns and about half as many Gardner guns of the two-barreled type in the land service of the United States. The Government had some time before ordered from the makers, a private firm, 100 of the Gatling guns, to be of the .30 caliber adopted for the new magazine rifle, and to use the same ammunition. A consignment of 15 of these new guns reached Tampa while the expedition was being fitted out for the Santiago campaign. A detachment of four pieces was formed, under command of a lieutenant, as an independent organization, under the direct orders of the general commanding. The detachment was not decided on until the 14th of June, after the expedition had already embarked, and as one result of this delay, the men were imperfectly equipped, not having any revolvers, and being hampered by having to carry the rifle, which was more of a burden than otherwise. There was no time to look after the proper equipment of the guns in the matter of spare parts for repairs, etc., and the pieces were taken into the campaign without any tools for repair, or possibility of overhauling a disabled piece, unless the enemy should furnish such necessaries out of a rare spirit of generosity. The men

to serve the guns were taken from infantry regiments, without special instruction of any kind until after they had been rushed to the extreme front of the lines, within 5000 yards of the enemy. Even then only four days were available for special instruction, and it became necessary, after the pieces were on the skirmish-line, to instruct men in the art of feeding the guns.

The guns were pushed right up in the hottest place there was in the battle-field, at "the bloody ford" of the San Juan, and put into action at the most critical moment of the battle, after part of the troops had already been forced back by the strong fire of the defenders, and so successfully subdued the Spanish fire that from that time to the capture of this practically impregnable position was only 8½ minutes. The expenditure of ammunition during this time, in which a continuous fire was kept up from three guns, was 6000 rounds per gun. The remaining ammunition, with the guns, was pushed up at once on to the captured position, which enabled the now exhausted troops to hold it without reinforcements against two counter-assaults of the Spaniards.

Colonel Roosevelt says of this: "Our artillery,

using black powder, had not been able to stand within range of the Spanish rifles, but it was perfectly evident that the Gatlings were troubled by no such considerations, for they were advancing all the while."

Again he says: "As the afternoon wore on, however, the Spaniards became bolder, and made an attack upon our position. They did not push it home, but they did advance, their firing being redoubled. We at once ran forward to the crest and opened on them, and, as we did so, the unmistakable drumming of the Gatlings opened abreast of us, to our right, and the men cheered again. As soon as the attack was definitely repulsed, I strolled over to find out about the Gatlings, and there I found * * * * two * * * guns right on our left, abreast of our men, who at that time were closer to the Spaniards than any other. From thence on * * * they were our inseparable companions throughout the siege. They were right up at the front."

General Shafter says in his official report, speaking of the assault on San Juan Hill: "In this part of the field most efficient service was rendered by * * * the Gatling Gun Detachment * * *. The

fighting continued at intervals until nightfall, but our men held resolutely to the positions they had gained at the cost of so much blood and toil."

The commander of this detachment stated in his official report that during the counter-attack of the enemy he had been assailed by a battery of 16-centimeter guns, and had successfully resisted the fire of this battery at a range of 2000 yards, driving the enemy's cannoneers from their pieces after they had fired three shells which were correctly ranged, and which exploded in the immediate vicinity of the Gatlings. This Spanish battery consisted of seven guns, as follows: one 16-centimeter converted bronze rifled gun, four 3-inch bronze guns, and two mountain guns. The claim was made in his report, "This is probably the first time that such a piece was ever silenced in land-fighting by machine-gun fire."

During the siege of Santiago, which followed, the Gatlings were used in conjunction with two automatic guns and a dynamite gun, exemplifying perfectly all that has ever been claimed for either of these weapons, as far as opportunity offered. The machine guns were used in the most advanced trenches to hold down the enemy's fire; were used

against heavy artillery, with the result that it could not be used by the enemy; were used to resist a night attack, and on outpost duty. All that had ever been claimed by the most enthusiastic advocates of the weapons as to their effectiveness was here exemplified, and the result of the campaign was to place the machine gun beyond dispute as a weapon to be reckoned with in some form in all future wars.

AT OMDURMAN.

Only about a month afterward this conclusion was strengthened by the prominent part played by the Maxim guns in Kitchener's fight at Omdurman. Here again, although against a savage foe, it was demonstrated that the machine guns are equally useful on the offensive and defensive, and that their fire is practically annihilating. The British lines were first viciously charged by the Dervishes, who were repulsed mainly by the fire of the Maxims; the English took the offensive in their turn, and pushed the machine guns into the thickest of the fighting. The slaughter was dreadful, being increased by the tactical formation in masses used by the Dervishes.

This historical summary leads to the irresistible conclusion that the machine gun has come to stay. It is no longer an experiment. It has been successfully used in battle under modern conditions, against veteran civilized troops, in trenches, and on the defensive it has long been acknowledged as probably the most powerful weapon now in the hands of troops. There only remains, in our country, the question as to how the weapon should be organized and used in order to develop its full power, both on the offense and defense, in the cheapest manner. Fortunately, we are able to profit by the experience of other nations in its organization, as well as by our own, which has been large and varied.

We are thus led up to the question of organization as a prelimianry to that of tactical use. In the usual discussions of tactics this aspect of the question does not have to be considerd, as the organization of the other arms of the service is well settled on the lines of long experience and public policy in each nation. In this case we are compelled to start at the beginning, and solve all the problems of organization in addition to those of tactical employment.

CHAPTER III.

ORGANIZATION.

The problem is to secure the highest development of power of the new arm under all conditions, both on the offensive and defensive, at the least expense. A complete solution of it has never been made by any nation, because, until 1898, the offensive value of the arm was in doubt. No nation cared to undertake the expense of an experimental arm. It must first be demonstrated under all possible conditions as an indispensable one in future wars. English and Russian officers have exhaustively discussed the subject, and there is much data of a theoretical nature available from these sources.

THE FRENCH ORGANIZATION.

The new invention was kept a profound secret by the French War Office, from even the line of their own service. At the outbreak of war in 1870, the guns were suddenly organized as an integral

part of the artillery in batteries of six guns each, and in the proportion of one mitrailleuse battery to three of field-guns. The war demonstrated two things: first, the tremendous power of the weapon when properly used and organized; second, that the artillery is not the right place for it.

IN THE RUSSIAN SERVICE.

The Russians then took it up and organized experimental batteries of from two to four guns each, but they made the important improvement of giving practically independent action to commanders of such batteries, and of employing them principally on the defensive in a tactically correct manner with infantry and cavalry. They have never developed the full offensive power of the arm, nor given it the place it has recently fought its way into as an auxiliary arm of equal importance with cavalry and infantry. The more advanced thinkers in their service, however, have fully recognized the probable development of the weapon. M. Gustav Roos, the Russian expert on machine guns, takes the following position, which is typical of the Russian attitude on the subject: "The machine gun constitutes a special arm, hav-

ing its own definite sphere of action, within the limits of which the enemy is struck in the most advantageous manner by the weight of metal projected, and with smaller loss of time and men than in the employment of any other arm whatever."

The present Russian organization consists of batteries, principally of Gatling guns, composed of eight pieces, considered for administrative purposes as a portion of the artillery, but held during active operations under the immediate control of division or higher commanders, and operated in a manner entirely distinct from the artillery. The Russian machine gun service, therefore, constitutes practically, for offensive operations, a distinct arm of the service.

THE ENGLISH SYSTEM.

It is to the English service that we must look for our principal exemplifications of the tactical use and organization of this arm. They have used the weapon under a greater variety of circumstances, and with more fatal results to their adversaries, than any other nation except our own. And we have surpassed them in only one respect—we have tested the weapon in civilized warfare, in attack of a fortified position.

The English began to make a critical study of the subject immediately after the Franco-Prussian War. The records of the Royal Military Service Institution are full of discussions from 1874 to 1898, by the brightest officers and most noted commanders of their service. After the theory had been thoroughly discussed, their machine gun service was organized on the basis of auxiliary fragments, or, in other words, of battalion guns as an integral part of both infantry and cavalry regiments, and this form of organization was given a thorough trial. After much experience and some actual use in campaigns, this system was modified, and the following is an outline of the present organization in their service:

"Machine guns are organized in detachments (now called sections), one of which forms part of each infantry and cavalry brigade, and of the mounted infantry regiment, while an additional one is attached to an army corps.

"Tactical Employment: The machine gun section is tactically employed only under the orders of the commander of the brigade or division to which they are attached, and will not accompany smaller units without special orders."—*Gunter's "Modern Tactics," 1895.*

In their system the brigade is the basis, but each gun is so manned that it can be used as a separate unit for detached action. Their service is hampered by a faulty system of mounts, and it is only recently that a truly universal mount has been perfected even in our service, including provision for transport of gun and a supply of ammunition under all circumstances. Such a mount has not yet been developed in their service. They use a tripod for the infantry gun, in which case the ammunition is carried on pack-animals. They use a so-called "galloping cart," drawn by one horse in shafts, for their cavalry service, which is capable of transporting a small amount of ammunition in addition to the gun. They have not considered the weapon's full power hitherto sufficiently developed to demand specially trained officers, and the guns are really commanded and fought by sergeants. A change in this respect is contemplated in their service.

MACHINE GUNS IN THE UNITED STATES.

Up to the present time there has been no system of organization officially adopted in the Army of the United States. About 1872, a number of

Gatling guns were purchased and distributed to the various posts. They were there placed in the hands of the post ordnance officer; the problems of instruction and training, organization and equipment being left to the discretion of the various commanding officers. About 1876, the Gardner gun was also adopted, and the same plan was pursued in regard to it. The result was a general neglect of all instruction in the use of machine guns, with an entire absence of any attempt whatever at organization. Sometimes a commanding officer would require a detachment composed of enlisted men, selected more or less at random, to receive an irregular and spasmodic sort of instruction, which never comprised anything beyond the mere manual of the piece, and which generally devolved upon the youngest officer in the post. There was nothing permanent in the *personnel* of these detachments, no standard of excellence, and no opportunity for target practice. The guns generally remained in the ordnance store-house, and were more objects of intermittent curiosity than of utility. In the few cases where machine guns have been used during active campaigns, they have been manned by detachments hastily organized, imper-

fectly equipped, inadequately instructed, and commanded, as a rule, by officers who had no special fitness for nor interest in the subject of machine guns. In various artillery hand-books, such as those compiled at the artillery school at Fortress Monroe, and Dyer's "Handbook of Light Artillery," a theoretical plan of organization for a single battery has been put forth with a certain degree of official sanction, always based, apparently, on the light artillery organization, and drawn up without any special study of the tactical requirements of the weapon.

In deducing the correct tactical organization, therefore, we must start from the assumption that no country has yet adopted a perfect organization for the arm. We must bear in mind that the universal carriage for machine guns is too recent to have been adopted by any nation, and that the offensive value of the weapon has been demonstrated too recently to permit of a complete reorganization in any country. We must therefore take a general view of the uses of the weapon, consult the experience of our own and other nations in organization, and endeavor to deduce a system which will permit the highest development of the full power of the weapon.

USES.

Captain Benson, R.A., one of the highest living authorities, may be quoted as follows: "There is a very important difference in the effective ranges of the rifle and the machine gun, when the former is handled by large bodies of men, which are very difficult to control in extended order in the excitement of battle. Machine guns can, and should, take their place with *any force* in the field, massed in battery under a staff officer, held at the immediate disposal of the general commanding for distribution by him to regiments of infantry or cavalry, as occasion might present, or for disposal, at his discretion, at any critical or suitable time or place." In reading the above the English staff officer must not be confounded with the American idea of a staff officer, and it is specially desired to note the emphasis.

Captain W. Anstruther Thompson, R.H.S., makes the following observation, May, 1894: "The value of a machine gun for purposes of defense is generally admitted among nations, but, as our own cavalry drill-book so ably points out, these weapons can do far more than this, and there is now no doubt that in taking part in a vig-

orous offense reliable machine guns will prove invaluable. Let them push out with the first line, if possible, wherever they may find cover, and dash out as opportunity offers and take the enemy by surprise. * * * * * * * * * * They are suitable alike for attack or defense, a useful auxiliary to any arm, and will prove themselves of value hitherto undreamt of."

Captain M. E. Carthew Yorstoun, 4th Bombay Cavalry, November, 1898: "The tactical use of machine guns is very simple, it is a weapon of opportunity, a concentrated musketry fire on a given objective. * * * * Gun commanders must be patient; if it is anything like a fight, they will surely find the target sooner or later, and then it is their own fault if they do not make their presence felt."

Captain Rogers, R.A., summarizes the uses of machine guns as follows: "Among the capabilities may be enumerated the acknowledged power of the Gatlings for the defense of entrenched positions and villages, for commanding roads, defiles, and bridges, for silencing fixed batteries or batteries of position, for increasing the fire of infantry

at critical moments, and finally, of supporting field batteries and protecting them against cavalry or infantry charges."

Lieutenant Pratt, R.A., adds to this catalogue, "Duty as artillery escorts," and Major Fosbury, of the English Army, is of the opinion that machine guns are "very valuable with advance guards of either infantry or cavalry."

General Abbott makes the following observation: "They concentrate within a small space the fire of whole regiments under the old system. They may be withdrawn from view and be made safe from capture at a small expense."

Hamley has the following to say of their use in the infantry attack: "I think it is indisputable that provided two forces otherwise equal are face to face, and the one that attacks can succeed in bringing up a line of machine guns, at such a distance as to bear effectively upon the enemy's position, an immense advantage will be gained in thus covering the otherwise very difficult attack of infantry."

Shaw mentions, among other uses: "Raiding operations, the infantry attack, flanking fire and

flank attacks, and the defense of positions," in his book on "Modern Tactics," 1890.

DEDUCTIONS AS TO EMPLOYMENT.

Enough has been quoted to show that some of the most eminent tacticians and experts assign a wide scope of usefulness to machine guns. From the advance to the rear guard, from the infantry support down through all the other arms of the service, to independent action in the field, from cavalry raids to the defense of fortified positions, and from the preparatory long-range artillery fire to the desperate infantry "rapid fire" immediately preceding the final assault: they are expected to crown the captured position as the readiest reinforcement, and to cover the retreat of a beaten army by desperate stands, in which men and guns will be recklessly sacrificed, if necessary, to gain the few vital moments for reorganization of the defeated and scattered forces. So wide a sphere of usefulness has never before been accorded to any single arm except the infantry.

The organization to be adopted must accommodate itself equally to all these varied and important uses. It must possess flexibility and adapta-

bility in the highest degree, must afford an easy and systematic scheme of administration, permit and foster the development of *esprit du corps*, and lend itself readily to coöperation with all the other arms of the service, as well as develop the highest efficiency in detached action. It is a problem worthy of the best talent to merely administer such an organization; where shall we find the ingenuity and originality necessary to devise it, breaking entirely new ground in the military science, and providing a fourth arm to meet all these varied requirements?

The first preliminary question is, On what basis shall the new arm be organized? It must be correlated in size to the army of which it will form a part. For the purposes of deduction, a basis of 100,000 infantry will be considered with suitable amounts of cavalry and artillery, all organized on the modern three-battalion basis.

The status of the new arm is first to be determined. Three propositions have been advanced by different writers on the subject, as follows: first, to incorporate the machine guns into the artillery, organized as light batteries; second, to attach machine guns to the different existing arms of the

service in auxiliary fragments called sections, as integral parts of infantry, cavalry, and artillery; third, to organize machine guns as an independent arm of the service. Each of these propositions will be discussed in turn, and the determining consideration will be the answers to the following questions: Based on common sense and on the experience of the past, first, what are the functions of machine guns? Second, what form of organization will develop to the highest degree their peculiar powers? Third, what form will give the greatest ease of administration and the greatest economy of expenditure?

THE FUNCTIONS OF THE ARM.

As demonstrated upon the battle-field, it is the most versatile arm of the service. At times it can take the place of each of the other arms, and it has, moreover, a distinct field of usefulness peculiarly its own. It is infinitely superior to artillery against *personnel*, forms the strongest possible infantry or cavalry reserve, is the back-bone of advance and rear guards, and renders a position once captured impregnable against counter-assaults. It can operate offensively wherever

infantry can penetrate, and can move as rapidly as the best cavalry. Its defensive uses are equally numerous and varied. There is no place about a fortification where it is not welcomed as a valuable auxiliary and reinforcement.

SHALL IT BE ORGANIZED AS AN INTEGRAL PART OF THE ARTILLERY?

The function of artillery is to destroy material obstacles and to produce a moral effect. The developments in 1898 indicate that artillery has ceased to be a practicable weapon within the range of small-arm fire. First and second zones of artillery fire, as heretofore classified, are still practicable for light batteries, down to include a range of about 1200 yards. It has been amply demonstrated that artillery can not live at shorter ranges, even when well supported by heavy lines of infantry. Conclusive proof of this is found in the retirement of the American light batteries from the vicinity of the San Juan block-house on the morning of July 2d.

The development of this principle in tactics makes a great change necessary in the equipment and instruction of light artillery. The light bat-

teries of the future must be equipped with telescopic sights and trained to accurate long-range work. Not being required to execute rapid maneuvers at short ranges under infantry fire, the caliber of the future field-piece will be larger than that of the present one, its destructive charge heavier, and its mobility much smaller. Delicate refinements must be introduced into the traversing and elevating gear of light artillery, and hydro-pneumatic buffers to absorb the recoil. The use of artillery fire will became more and more a matter of scientific discussion and training. The character of the artillery *personnel* will be to a great extent affected by these changes. It has not been a matter of observation in the past that scientific elaborations conduce to dashing soldiery. The artillerist will be a cold-blooded man of science, whose head will be full of long formulas and mathematical deductions. He will operate at long ranges, where the optician aids the naked eye. He will seek to view the unseen, to measure empty space and to make allowance for hygrometric densities.

The machine-gun man will belong to a different cult. He must be hot-blooded and dashing. He

must have all the *verve* and *élan* of the best light cavalry, all the resisting power of stolid and immovable infantry. He is not to reason on abstruse theorems nor approximate difficult ranges; his part is to dash into the hell of musketry, the storm of battle, and to rule that storm by the superior rapidity and accuracy of his fire.

The characteristics of the machine gun and its crew are therefore essentially different from those of the artillery of the future and, it might be added, from those of the artillery of the present. The line of reasoning which must actuate the conduct of the machine-gun man is essentially different from the artillery *motif*. The experience of the battle-field has demonstrated that a greater degree of independent action pertains to the machine guns than is the case with artillery. Moreover, the artillery has always exhibited a hostile spirit toward the machine guns. Birkhimer, who makes an effort to divest himself of artillery prejudices, has this to say: "For some reason a deep-seated conviction has taken possession of the enlightened military mind that machine guns have not yet won for themselves a place in field armament side by side with some other engines of destruction. * * *

In what respect, therefore, is the machine gun apparently relatively weak as compared with some more powerful competitor? The answer as exhibited, both on the proving-ground and on the battle-field, is that at long ranges it is relatively inefficient as compared with the field-gun, which latter has demonstrated and maintained its superiority for general utility in a campaign, and is therefore the favored weapon. For machine guns to attempt to fight field-guns at ranges of 2000 yards and upwards would be suicidal." He also takes the position that the future development of hasty entrenchment will relegate machine guns to a position of less importance and practical utility than heretofore.

A sufficient answer to these criticisms is found in the observation that battles are not decided at the range of "2000 yards and upwards," but at those short ranges, 1500 yards and down, where machine guns are admittedly the most effective. His prediction in regard to future developments depending upon field entrenchments was not logical at the time it was made, and has been refuted on the battle-field. It would be a logical result to expect that the weapon which offers the greatest

target would suffer most on account of field entrenchments. It would be equally a logical result that the weapon which could produce a continuous sweeping fire would maintain itself more easily than one depending upon the unaimed fragments of a bursting shell, fired intermittently, at the small target presented by a shelter-trench. What should have been expected actually happened. *The field-gun, with its large target and great exposure of personnel, was compelled to withdraw from rifle-range; while the little machine gun, indistinguishable as a target and deadly accurate in its fire, maintained itself with ease upon the most advanced skirmish line.*

Captain Nolan, R.A., M.P., makes the following remarks: "It would be very difficult to bring the Gatlings into the field without displacing the artillery. That is the real objection of artillery officers. It is not that they claim that the field-guns are more destructive to cavalry or infantry than Gatlings, but because the latter are of very little use in the artillery duel, and an artillery duel will generally precede every engagement. To have the Gatlings they must sacrifice the same number of guns, and a few guns more or less

makes all the difference in an artillery duel." The root of Birkhimer's objections, upon critical analysis of his discussion, is the same as that mentioned by Nolan.

So long as the attempt is made to incorporate machine guns as an integral part of the artillery, this objection will be valid. When so organized in the artillery arm, machine gun batteries will undoubtedly displace a nearly equal number of light batteries. The machine guns will be associated with guns with which they have nothing whatever in common, and the usefulness of both will suffer. The training of the two arms is so different that interchangeability of officers and men is neither desirable nor possible. Thus, by logical analysis, it will be readily seen that machine guns ought not to form part of the artillery.

Historical examples are full of warnings against this mistake. The French have always regarded it as part of the artillery, and they have been notoriously unsuccessful in handling both the field and machine gun. The Russians organized the machine guns originally as part of their artillery, but the test of war soon led to such an independence of action of their machine gun bat-

teries as to constitute them for all practical purposes a separate arm of the service. The English, after a thorough discussion of the subject, abandoned the artillery idea in favor of the auxiliary fragments. It is absolutely necessary to get away from the artillery idea in order to be successful in handling machine guns.

SHALL THE MACHINE GUNS BE ORGANIZED IN AUXILIARY FRAGMENTS AS PART OF THE INFANTRY AND CAVALRY?

The equipment of machine guns is entirely distinct from that of either of these arms. In the case of cavalry its fundamental function as cavalry should never be lost sight of. However well our cavalry performed the function of infantry in the last war, and it was fully equal to the infantry itself in every respect, there can be no doubt that the Army suffered severely from a lack of the proper performance of the cavalry functions proper. The duty of security, fortunately, was easily performed; but the equally important duty of information; which devolves mainly upon the cavalry service, was not performed at all.

That much valuable information could have been gained by resolute and enterprising cavalry, between the 26th of June and the 1st of July, if cavalry had been available for its performance, cannot admit of the slightest doubt. Machine guns, as an integral part of a cavalry squadron, will often be an unmitigated nuisance in the performance of strictly cavalry duty. What is to be done with them when they are not wanted? Is the squadron commander to break up his command into fragments? and if so, how and when is it to be reunited? Shall we handicap so important an arm with an impediment on wheels? *And, lastly, can we expect the highest development of the machine guns themselves if they are relegated to so subordinate and inferior a position? The experience of other nations warns us against so fatal an experiment.*

If the machine guns are ill adapted to be an integral part of the cavalry, still less are they fitted to constitute a part of the infantry. That they may be often used in conjunction with both these arms is true, but the same is true of the light artillery, which has long ago been taken out of these arms on account of its different functions and different training. The same remarks as to the dif-

ference of functions made in reference to the cavalry apply with equal force to the infantry. The principal objections against making them part of the infantry arise from the great difference of equipment and use. The infantryman is armed with a rifle, the machine-gun man with a gun on wheels or on a pack-mule. *The infantryman seeks above all things contact with the enemy. His one raison d'être is to get within bayonet reach of his foe. His fire-action is merely to enable him to accomplish this one thing.* Anything that hampers him in the execution of this purely infantry function, anything that he can not take as a weapon to this ultimate work, is out of place as part of an infantry organization. The machine gun will contribute to this function of the infantryman, as it will to those of other arms, but, if made part of the infantry, must be abandoned at the moment of contact. This will introduce a new complication into the duties of the infantry officer. When will the machine guns rejoin their commands in the confusion of a sanguinary charge? At a time when all is confusion, necessarily, and the infantry officers are busily engaged in restoring order in the disorganized line, who will make sure that the essential func-

tion of placing the machine guns on the captured position, and punishing the discomfited enemy to the full limit of all opportunities, is duly performed? We have already seen how varied are the duties of the machine guns. To a proper performance of these a careful and systematic preparation is very necessary; years of special study, months of careful planning. If made part of the infantry or of the cavalry, who is to do this? Shall all the officers of these arms be prepared for this duty? Impossible. *Special aptitude, special talents, special characteristics are necessary, as well as special training, for the proper service of the machine gun.* Shall some of the officers of these arms be set aside for this duty? This is merely begging the question, and results in the end in the formation of a separate body, without stability, without *esprit*, and existing merely as a temporary makeshift.

The conclusion is therefore arrived at that the machine guns should constitute a separate corps, distinct in personnel, in training, and in the line of promotion.

This conclusion is supported by not only our own experience in peace and war, but by that of

other countries as well. The English, after a full trial of the fragmentary system, have adopted one that is for all practical purposes a separate organization. The Russian batteries, with their semi-independent action, constitute but nominally a part of the artillery arm. In our own service, during the only campaign in which the machine guns were used successfully on the offensive, they constituted an independent organization in the hands solely of the corps commander. No other officer, no matter how high his rank and command, was permitted to give orders to this detachment. It is believed that the results accomplished by this organization could not have been attained without that independence of action so wisely conceded by General Shafter; certainly not if the machine guns had been under the shadow of the artillery arm, judging by the use made of it in the campaign; and certainly not as a lot of disseminated fragments, forming a part of the different regiments which participated in the charges on the San Juan Hill. Imagine a machine gun attached to the 6th Infantry, for instance, trying to follow that gallant regiment through the jungle to the position from which it made its first abort-

ive and second gallantly successful charge! Yet this is what a regimental machine gun would have had to do, or else the regiment would have had to disintegrate to the extent of detaching its machine guns. What effect would such disintegration have on the *morale* of infantry trained to rely on the use of the guns as a part of the regiment at drill? Far better was the organization as used, and it amply vindicated the wisdom of those who planned and carried it out. The action at San Juan Hill affords, as far as the use of infantry and machine guns is concerned, a fair type of what we may expect in the future. The enemy was intrenched in a favorable position, with a cleared space of some 600 to 800 yards in front of them, and with narrow approaches, commanded by artillery and rifle fire, through which the opposing infantry was compelled to pass in order to deploy for the assault. This is exactly the kind of position that a force on the defensive will always seek, and the use there made of the machine guns on the offensive is no less a type of the correct employment of this weapon in such a case.

The conditions to be met by the machine gun are as exigeant as those confronting any other arm

of the service. They cannot be met by a fragmentary portion of some arm of the service. They cannot be met without special training and study. They demand a distinct *personnel*, with its own line of promotion and its own technical studies. They demand a separate arm of the service, independent of the other arms as they are of each other.

CHARACTERISTICS OF GOOD MACHINE-GUN MEN.

The perfectly trained and thoroughly competent machine-gun man is the very highest type of the modern soldier. The functions he must perform are so varied, his field of usefulness is so large, that he must have special training for his work. He must make a thorough study of the conditions under which his work will be performed, and prepare in advance an intelligent plan of operations to meet any emergency. He must thoroughly understand the tactical uses and possibilities of all the other arms, and the peculiar usefulness of his own in relation to each of them, and to any and every combination of them in all cases.

These views are supported by the best foreign

students of the subject, as well as by the weight of our own experience.

Lieutenant-General Sir Beauchamp Walker, K.C.B., in an address before the Royal United Service Institution, while making a strong plea for a separate machine gun arm, said: "I do not think that the infantry should be encumbered with anything in the shape of a gun, and I believe that is the opinion of most men who have served long in the field, and it is certainly the opinion of the infantry themselves. I particularly remember what was said in Berlin when the question was carefully discussed after the war. 'The infantry won't have them, and the artillery don't want them.'"

Captain (now Colonel) Rogers, F.R.G.S., says: "I hold that the Gatling battery should be regarded as an entirely separate and unique organization; as, in fact, a fourth arm of the service."

Captain Charles E. Callwell, R.A., in his prize essay of 1886, may be quoted as follows: "If those interested in the question of machine guns would endeavor to create a form of the weapon that could with ease be carried by two men or on a horse, that could be relied upon not to

collapse from mechanical defects at a moment of crisis, that could act as an auxiliary to infantry and cavalry under all circumstances without being a burden, their efforts might produce a mitrailleuse capable of moulding the tactics of the future as the breech-loader has moulded the tactics of the present." We now have such a machine gun as the author quoted demanded, and we have, moreover, proved its use on the battle-field and in the most difficult campaign in modern times, to the perfect satisfaction of the whole Army.

Captain Benson, R.A., a great English expert, makes the following plea for an independent organization: "There are some useful qualities pertaining to machine-gun fire which are not shared equally by that of the other arms, and it behooves us to use these weapons in such a way as will bring out these qualities and make the utmost use of them. The effect of fire is said to depend on two things—viz.: first, its suddenness; second, its intensity. The latter is a quality evidently possessed by machine guns. The suddenness depends upon the circumstances of the case and whether it is expected or not. Clearly, then, to make this fire unexpected and sudden, it is necessary to make

the weapons as capable of as rapid movement as possible, so that they may be placed in the required spot, at the required moment, which means practically, if accomplished, that their fire will be sudden and unexpected by the enemy. The ranges at which machine-gun fire is most decisive in its effect, compared with that of the other arms, are probably between 800 and 1600 yards, and in future wars it appears that battles are not unlikely to be decided at those ranges. Machine guns can not supply the place of skirmishers, nor yet that of artillery, but would play a very special *rôle* when occasion required." He then proposes an independent organization for each army division, composed of three troops of four guns each, organized as a special arm, and held under the immediate orders of the division commander. He compares the power and usefulness of such an arm with the same characteristics as they would be exhibited by the same number of guns disseminated in the form of regimental fragments, among the infantry and cavalry, and says of the latter: "Such organizations as these are opposed to all the lessons of war and to all ideas of that simplicity which is so essential in war-

fare. The officers and men of such a corps would be required to know everything about their arms, and thus their work would be doubled, or else the special officers and men selected for the machine guns would be left to themselves and practically constitute a separate unit. The three powerful troops of divisional machine guns would deliver a fire equal to that of three dozen of the light machine guns, which could be carried on mules or pulled by infantry, while in the fire discipline of the two forces there would be no comparison. In addition to this, the principle of the concentration of fire of several machine guns at once on certain localities must be kept in view, and it could not be managed if in order to do so it were necessary to collect the scattered little machine guns from the various battalions and regiments; for that would take up valuable time, and, even when massed together, the want of previous practice in working together would make proper regulation and control of fire an impossibility. It is easy enough to get forces to act separately which have been trained to act together, but it is a very different matter to get

those to act together who have only been taught to act separately."

Major W. W. M. Smith, R.A., writes as follows. "The immediate support of the infantry is the most urgent of all the wants of our present tactical system. The infantry is *the* arm of the service, which is told off to carry an enemy's position or to defend one of its own; and the more closely our new organization subordinates the action of the new weapon to the urgent necessity of supporting the infantry in both attack and defense, the more striking useful result we shall get. In my opinion, the machine guns ought to act with the brigade of infantry under the immediate orders of the brigadier commanding the infantry brigade. I believe the idea of affiliating the new arm to any of the existing arms to be the greatest of all errors."

It is particularly worthy of note that these views of Major Smith have finally become the foundation of the present machine gun system of the English service, which has undoubtedly the best system of any nation in the world in this respect. (See Gunter's "Modern Tactics.")

Lord Chelmsford says: "I must say, speaking

as a general officer, that I think there will be a very great advantage in having this arm as a special unit attached to either a brigade or a division, equipped and organized so as to be used to the best possible adavantage, wherever the general officer may think best. When not acting with any particular arm, the general officer could keep these weapons in reserve, and would be able to use them in the manner best suited to assist his general plan of operations. With regard to the organization, I contend that it ought to be a separate unit."

We quote again from Lord Charles Beresford: "Machine guns have a very useful part to play in future wars. Of one thing I am certain, that directly we produce a smokeless powder, they will have a most important part to play. The suggestion is very wise that this weapon should not supersede any arm of the service. Why should it? It is a new arm. It has capabilities that other arms have not got. It is something else that must be counted on when you go into action, and as far as you can utilize it to knock your enemies into a cocked hat the better for you; but take care that they do not utilize it against you. You must be

prepared to meet like with like, which is so important in all warfare. I have commanded these guns on shore as well as afloat, and I think one of the principal points to realize about the machine gun is that it should be a unit. If you put it into batteries, if you put it into troops, or into any section or similar formation, where the guns have got to work together, you would make a mistake. They should be essentially skirmishing clusters of rifles, and with each gun should be its own officer. If you like to call them a 'battery' or 'troop' for marching and peace-time, do so; but the moment they are put into action they should work in separate units: one man might go to a clump of trees or a bridge and hold them, and another gun to another place, an officer with each unit, and do something equally good; but directly you put them into a 'battery' you will have a battery firing at them possibly. You get hit on the flank and you are knocked out of action as the French mitrailleuses were by the Germans in 1870."

Major-General W. H. Goodenough, C.B., R.A., Inspector-General of Art, remarks: "The weapon is entirely different from the artillery weapon

proper; its aims and its powers are entirely different. I think in a campaign it must remain a rule that an infantry regiment or battalion, or a cavalry regiment, will not always require to have a machine gun with it. It might go over ground where such a gun could be absolutely of very little use, and therefore, I think, a general would wish to be able to attach a machine gun to an infantry regiment or to any body of troops for a time. In order to enable him to do this, he should have a train of machine guns, each gun as a single unit, and ready to go by itself, to be detached for any number of days to any point where its services were required."

We thus arrive, both by deduction, by precept, and by experience, at the conclusion that the proper organization for machine guns is that of a new and independent arm of the service. There is no law, written or unwritten, which limits the service to three arms. The only limit is that of economy, and it is self-evident that true economy demands the most effective organization. By using it we shall obtain the desired result at less expense, because we shall avoid loss of energy in our military machine. We shall make each part perform

its allotted work in the best manner, under the best conditions possible, and shall therefore be able to get along with a smaller because a more efficient force. There is a "modulus of efficiency" in the military machine, as well as in every other.

THE NECESSARY QUALITIES OF THE ORGANIZATION.

The organization must seek mobility, flexibility, and fire development. There must be due regard to convenience of administration, and it is necessary to so distribute the officers as to provide a reasonable sequence of promotion. The first quality sought, mobility, demands a mounted organization. The guns must be mounted on a light carriage, capable of being easily and surely moved by draft, by pack-mules, or by hand, and there must be a liberal ammunition supply on the carriage, available for instant use with the guns. There must be a suitable ammunition-cart, interchangeable if possible with the gun-carriage, to solve the cognate problems of reserve ammunition and repairs to disabled carriages. The second requirement, flexibility, demands an organization capable of splitting into vital, self-directing frag-

ments, and of consolidation into massed batteries under the direction of a single head, all amid the turmoil and confusion of a sanguinary battle. This calls for at least one commissioned officer with every gun. The two points thus laid down insure the fulfillment of the third, fire development.

CHAPTER IV.

THE TACTICAL UNIT.

The true tactical unit of machine guns is the single piece. It is necessary to draw them together for ease of tactical direction, and, sometimes, to produce concentration of effort. The massing of machine-gun fire, to a much greater extent than is the case with artillery, implies more or less of a massing of pieces.

But it is a self-evident proposition that each machine gun must be equipped and always capable of complete independent action so far as the coöperation of other machine guns is concerned. This absolutely requires the presence of one commissioned officer with each gun. Here we have the first requirement of the true organization. The presence of a specially trained officer will insure, as far as such a thing can be insured, that the gun will always be judiciously used, that it will throw its great weight of fire into the scale at the precise moment when such an accession of

fire will be of the most advantage. It will also make sure that the expenditure of ammunition is not excessive. The ammunition question is important, not so much on account of the money value of the cartridges, but because ammunition has a value beyond price in the critical moments of the battle, and a cool judgment is required to husband it for the best opportunities. Only a limited amount can be carried up to the first firing-position with the guns, the moment at which it can be replenished is uncertain, and its usefulness at the right moment is so great that the utmost good judgment is required in expending the first supply. These considerations fix beyond discussion the presence of one officer with each gun.

ORGANIZATION OF A PIECE.

The enlisted *personnel* pertaining to a gun will vary according to the weapon used, but will be rarely less than six men. Even considering the Colt's automatic rapid-fire gun, which requires as small a *personnel* as any in existence, it is found by the experience of the battle-field that six enlisted men are required to properly man this gun,

even when it is not a mounted crew. If we consider the mounts for the men, it will be necessary to add another enlisted man to act as horse-holder. One man is required at the trigger all the time, two more to fill the belts, one to watch the feed, and at least two as a relief, as a reserve, and for purposes of observation. In using the Gatling it was found that about the same number is necessary. A detachment composed of 1 sergeant, 1 corporal, and 6 privates was the best working organization for the gun. This afforded enough men to run the gun by reliefs, after the siege began, and to insure that the piece would be well served in action at all times. Of course, when battle losses began, it was necessary to run the guns with reduced numbers; sometimes only three men could be at hand. When the detachments became thus reduced, it was necessary to obtain reinforcements as soon as practicable. We may therefore, as a result of experience in actual warfare, fix the gun crew as follows, subject to modifications for the particular weapon used in a particular case:

1 Commissioned Officer.

1 Sergeant.

1 Corporal.
6 Privates.
1 Driver.

THE NEXT HIGHER UNIT.

It is indispensable to proper tactical handling of the guns that a mature judgment have supervision of as many pieces as practicable. This supervision is always valuable, and in case of massed fire is indispensable. The question of how many pieces shall be united into a tactical unit is one to be determined by experience, and by a consideration of the principles upon which the organization is based. The relation of numbers between machine guns and the infantry may be stated at once as properly a machine gun to every battalion. This is not a compromise between the extreme views at all. On the one hand, it is claimed that there should be a machine gun to each company; on the other, that one "battery" or "troop" of three or four guns is all that will be required for the use of a whole army corps. The fallacy of the last position is apparent. If machine guns are to be a factor at all in military operations, they should be used to the full limit of their usefulness. The

Fifth Corps in Cuba had four guns for the whole corps. The need of more was acutely felt at El Caney, and on all parts of the line at all times after the 1st of July. It was the general expression of all trained officers in the corps after the first day's battle, that there ought to have been a hundred of the machine guns instead of only four. At El Obeid the army of Hicks Pasha was wiped out of existence because of a lack of a sufficient number of machine guns.

But there is a limit to the number that can be made sufficiently useful to pay for their transport and for their room on the firing-line. Useful as they are, they cannot be regarded as anything more than an auxiliary to the infantry, which is the true back-bone of all armies. This limit will be found in the relation of their fire and range to that of infantry. Considering the battalion reserves, the individual equation of the soldier under fire, and the conditions of battle, a machine gun is, as a general thing, the equivalent of one battalion in actual firing power. There are times when it is equal to a whole brigade, and other times when it is of less value than a single company; but the estimate given is the general equiva-

lent of the fire of a single machine gun. The tactical organization to which a machine gun organization will be most frequently sent, and with which it will be most frequently called upon to coöperate, is the regiment. This fixes the tactical unit proper for machine guns at the equivalent of a regiment—viz., three guns.

There are other reasons which point to this as the true unit. It was found by experience, the one military argument that admits of no controversy, that three guns is the largest number which one officer can handle to best advantage on the offensive. The largest number of guns which could be got into action effectively at any one time and place *on the offensive* was three, and this in spite of every effort to get all the guns going at once. Later, on the defensive, in trench, for siege operations, there were seven employed at one time effectively —six guns in one place and one alone. The six were used in the form of two units, one of four guns and the other of two guns, both working effectively. But the whole organization was massed in a space in the trenches of not over 100 yards, with plenty of covered ways as approaches. Their tactical handling presented then no great problems to

any one who had made a bit of a study of the proper use of machine guns.

An organization of three guns will give the most effective service in the general case. In the discussion of advance guard duty and similar employments, later, it will be seen that this number of guns will lend itself readily to all the requirements of machine guns, and will be a generally serviceable unit. It is, moreover, a convenient unit of administration. It will require only three officers, which is the number usual in a suborganization in our army, and is the logical outcome of our own experience in war. The name by which it shall be called is a matter of indifference. The use of the word "battery" is not favored, because that word is associated with the artillery arm, and suggests a force capable of demolitions. It is misleading as applied to machine guns. Similarly the word "troop" is a cavalry word, and implies something of the rush and whirling enthusiasm of a cavalry charge. Such characteristics have no place in the tactics of the machine gun. It is the most calculating and cold-blooded weapon in its employment that any arm of the service affords—yet demands the greatest amount of dash

and enthusiasm in its final desperate work. It is a matter of the most cold-blooded calculation as to when it should be sent in, and of the most spirited execution when it is finally loosed upon the enemy. The word "company" is not the exclusive appellation of any organization in our service. It is applied indiscriminately to infantry, cavalry, and light artillery; why not, then, to machine guns also? We shall therefore designate the tactical sub-unit as a "company" of machine guns.

The question of how many officers shall constitute the full complement of the company depends on the one consideration that there must be an officer to each gun. There is an instance where one officer has successfully handled three guns in action on the offensive, but he states in his report that he was assisted by three sergeants, each of whom was perfectly qualified for the position of a commissioned officer. There is no particular necessity of relieving the captain of gun duty for administrative duty. The company is not to be regarded as the administrative unit, but as the battle unit. Hence we fix upon one captain and two lieutenants as the proper complement of a company of machine guns. But there will be cer-

tain duties to be performed in each company quite indispensable to the proper maintenance of efficiency in the battery, yet not directly connected with the guns. The men must be fed, hence we deduce a company cook; there must be a first sergeant, of course; the company property should receive intelligent special care, so we require a quartermaster-sergeant; a trumpeter will be indispensable; a farrier is necessary, and there must be at least one surplus man for a horse-holder, as this is to be a mounted organization. So we may sum up the company organization as follows:

1 Captain.
1 First Lieutenant.
1 Second Lieutenant.
1 First Sergeant.
1 Quartermaster-Sergeant.
1 Company Clerk.
1 Trumpeter.
1 Farrier.
1 Company Cook.
1 Horse-Holder.
3 Sergeants.
3 Corporals.
3 Drivers.
18 Privates.

This combination will be capable of the highest degree of independent action, will be capable of the greatest degree of mobility, and will be capable of splitting into three vital, self-directing, independent fragments, each one a unit for all practical purposes, and complying fully with the dictum of Lord Beresford on the subject. Nothing could be reasonably asked of this company that it would not be perfectly fitted to perform. The highest test of an organization is whether it lends itself perfectly to all the functions for which it is constructed. This is such an organization, and will be adopted as the basis of our study of machine guns. It is almost an ideal organization.

ORGANIZATION OF SUPERIOR UNITS FOR ADMINISTRATIVE PURPOSES.

The matter of the administrative unit depends primarily upon what unit of the Army is to be made the tactical basis of the machine gun service. The army corps has its artillery, peculiarly fitted for a corps weapon on account of its great range, which demands the front of a whole corps as a basis of operations. The theory of brigade artil-

lery has long since been abandoned in all civilized armies. But the need of a strong support in immediate reserve for the troops that are to make the real attack is as great now as it was when this need led to attempts to use the artillery for that purpose. In the machine gun arm we have a weapon suited by all its characteristics of caliber, range, and precision to fulfill this function. By placing it as distinctly a brigade weapon it will be sure to be at the very points where its support is most needed at the time when it is wanted. It will rarely happen that there will not be some place on the brigade front in which these small weapons can be placed to do their effective work, and some road or trail leading up to such position. This will not be true of the regimental front, in the general case. The corps front will be so extended that artillery ranges will be necessary to effectively cover it. The machine gun, alone, is admirably fitted to perform the function of a brigade reserve, when the brigade is acting in corps, and the artillery is used to assist in covering the flanks, which are also provided with their usual cavalry cover. Again, at the ratio of machine guns assumed as the correct one, the size of

a corps organization would be too large for convenient administration, while that of a brigade organization would be convenient. We must consider that the administrative unit should bear a certain relation to the tactical unit of three guns adopted. In case it is desired to mass the guns and to mass their fire, three units of three guns each will give as large a battery as it is ever likely to be advisable to mass for firing on a single objective, or for massing in a single battery.

The adoption of an administrative unit has a distinct relation to the number of officers required in the new arm of the service. It will have a very important bearing on the promotions to be made, and any undue disproportion of superior officers, with consequent blocking of promotion at a given grade, will operate to the detriment of the new corps. Considering all these points, with due weight given to each, it will be seen that the proper unit of administration is a battalion of three companies, the full complement of a brigade composed of three regiments in our service, to be commanded by a major.

An administrative office demands certain provision to be made for purely administrative pur-

poses. Thus we require at once an adjutant, and, following the precedents of the service, assign his rank as that of first lieutenant. We need a sergeant-major, and must have the two clerks usually required to transact the record business of such an office. It is not proposed to include a quartermaster in the list of these officers, as the adjutant and major should be able to transact all the administrative business of such a command. Their freedom from tactical responsibility is much greater than that of the corresponding officers of the other arms, as that function is, except in rare cases, one pertaining, in the machine gun service, to the captains.

We thus arrive at the following as the administrative unit of the corps, being the brigade complement, whether of infantry or of cavalry:

1 Major.

1 First Lieutenant and Adjutant.

1 Sergeant-Major.

2 Battalion Clerks.

3 Companies.

The major is brigade chief of Machine Gun Service, and is a member of the staff of the brigade commander.

The organization of an army corps of three divisions of infantry, with its appropriate amounts of cavalry and artillery, can hardly be considered complete without its reserve of machine guns, which would be held at the immediate disposal of the corps commander, and which would be used for the duties of detached service, artillery escorts, and at critical moments as directed by the corps commander. Such a reserve would demand at least another battalion, and its presence would make necessary on the staff of the general a corps chief of Machine Gun Service.

We thus find that the complete equipment of an army corps will require one battalion of machine guns for each infantry brigade, one for the use of each cavalry brigade, and one in reserve at the disposal of the corps commander. If we consider the cavalry division organized on the usual basis of three brigades, we have a total of thirteen battalions of machine guns to each army corps.

To look after so large a force will be too big a task for any one officer, hence the corps chief of Machine Gun Service will require assistance. We therefore place on the staff of the corps com-

mander a colonel as chief, with a lieutenant-colonel as assistant.

In addition to the force thus provided, there must be a chief on the staff of the division commander, whose rank should be superior to that of the brigade chiefs, hence that of lieutenant-colonel.

We therefore arrive at the following schedule as the roster of the machine gun service of an army corps.

1 Colonel, Corps Chief of Machine Gun Service.
1 Lieutenant-Colonel, Assistant Chief.
4 Lieutenant-Colonels, Division Chiefs.
1 Battalion, Corps Reserve.
3 Battalions, Cavalry Division.
9 Battalions, Infantry Divisions.

An army which has 100,000 infantry will be organized into four army corps, and should have a general reserve at least equal to the complete equipment of one corps. This reserve of material need not be fully manned, however; it could be conveniently kept in the form of *dépôt* companies, manning only so many of the guns as might be necessary to provide a suitable recruiting basis of instruction for the army in the field. The action

taken for this purpose would depend upon the military establishment and policy of each nation concerned.

The head of the corps thus outlined should be a brigadier general, chief of the Machine Gun Corps, and he would require two assistants. One should be a colonel, the other a lieutenant-colonel.

COMPLETE ORGANIZATION FOR 100,000 MEN.

Total Enlisted.....5460.
Total Commissioned..... 599.

This organization will be the one discussed in the following pages.

CHAPTER V.

MACHINE GUNS ON THE OFFENSIVE.

The offensive uses of the machine guns have been as fully demonstrated as those of any other arm of the service. They have been used at close quarters and against entrenchments; in the open, and under cover; with and without supporting troops; they have demonstrated their mobility and serviceability, over any and every kind of ground and in all kinds of weather.

Therefore we state that on the offensive they are useful in conjunction with every other arm, and may be used alone where no other arm could be so used. The offensive use will be treated with respect to infantry, cavalry, and artillery, and as an independent arm; with advanced guards, outposts, the cavalry screen, and in battle.

ADVANCED GUARDS.

With Infantry.

The first duty of infantry before an enemy is found on the advanced guard. Here the machine

gun arm is most perfectly in its element. It gives a stiffening to this part of an aggressive force which enables the commander to do either of two things: 1. He may reduce the size of the advance guard, thereby relieving the men to a very considerable extent of an extremely arduous duty, while maintaining to as high a degree as was formerly the case the service of security for his marching column. 2. He may increase the strength of his advance guard by the addition of the machine guns, thereby enabling it to take a more strongly aggressive tone toward the enemy. The first will be the more usual case.

The increase of fire power due to machine guns will vary, of course, with the number used. When there is a good cavalry screen in advance of the army from 10 to 20 miles, it would be practicable to use a comparatively small force of infantry, employing them merely as feelers and as flank-watchers. If the effective force of infantry be very small, with a proportionally large force of machine guns, it would often be practicable to put whole companies of machine guns on advance guard duty alone, relieving the infantry of this duty entirely. In this case the crew of the third

gun in the company would be used as feelers and flank-watchers, ranging well out to the front and flanks of the line of march. The other two pieces must march prepared for instant action. The feelers perform the duty of observation, the two other guns that of resistance. In case of engagement the feelers may act as an infantry support, falling out toward the flanks, or a few of them may so act, while the remainder return to their piece and use it as a support to the other two. At the first alarm the two leading pieces must be instantly made ready, taking the most favorable position, while the third is prepared by the driver and the first sergeant for action in any required direction. It should be usually held as a protection to the flank until the enemy is developed, and then as a support to the other pieces as may be needed. If necessary, a couple of men can be detailed from the other pieces to assist in manning the third until its proper crew can be drawn in for that purpose.

Acting Alone.

The action of the machine gun company acting alone as an advance guard will necessarily be more or less on the defensive. Its commander

must continually observe the country, and his first thought on encountering the enemy should be to seize any commanding position on favorable ground, particularly any position that will be advantageous to the action of the main body. He should always assume that he can hold his ground against a frontal attack from any number whatever; and from an attack from the front and one flank as long as may be necessary, or until support comes from the main body. There never has been and cannot be such a thing as a successful attack on a line of machine guns, in a favorable position, in action, until the machine guns have been well battered by artillery fire. If the screen duty has been well performed, this contingency will have been foreseen and provided for, by having artillery at hand to oppose that of the enemy. The prime duty of the machine guns in this case is to seize and hold the most favorable place for the artillery until that slower body can be brought up and be put into action. Then it will be the duty of the machine guns to guard the flanks of the artillery, relieving the infantry of this duty during the artillery duel, which duty can be performed without remaining in the immediate vicinity of the artil-

lery position. Indeed, the machine guns should seek to keep away from the immediate vicinity of an artillery position. They cannot contribute to the fire of a battery in any way, can guard its flanks better from a position more removed, which will likewise enable them to bring a cross-fire across the front of the battery if necessary, and they will thus avoid suffering losses due to the enemy's fire during the artillery duel, at which time he is sure to be occupied with our artillery, and not the machine guns. This discussion is rather an anticipation, however.

In opening upon the enemy, during the duty of advance guard, the invariable rule for the machine gun commander to act on is to seize ground in advance. The machine gun is essentially an aggressive weapon. He has no reason whatever to fear capture. All he has to dread is long-range artillery fire. This is not likely to be very effective, even if he is located by their batteries; and if it becomes so, he can easily move to one side, or forward, or back out of sight or range. If the cavalry screen has performed its work properly, he does not have to consider this contingency at all. When the artillery has arrived and receives

a proper support by the arrival of infantry, the machine guns advance under cover of the artillery duel to effective machine-gun ranges.

When acting as advance guard alone, the feelers and flankers go out under command of the officer of the piece to which they belong. The piece is left in charge of the first sergeant and driver, who are capable of operating it alone for a brief time, in case of a sudden emergency upon one of the flanks. These feelers are thrown out for purposes of observation merely. They may sometimes be used as a decoy to draw the enemy into range, but, as a general thing, they merely observe and report by signal what they see. The carbine, usually carried slung by the gun crews, is made ready for action, with filled magazine. The men scatter over as wide a front as practicable, depending on the kind of country, and move under cover as much as possible. Upon finding the enemy, they at once seek concealment and cover, and approach as near as possible. When discovered by him, they comply with whatever instructions they may have received in the particular case. These will depend upon the plans of the commander.

The commanding officer of the company is notified by signal or by messenger at once upon discovery of the enemy, including his numbers, direction, character, and disposition. The action of the advance guard at this stage depends entirely upon the plans of the commander, but its natural tendency is to seize ground to the front. Its primary function is to prevent the surprise of the main body, and its next duty is to seize any good position and to hold it for the use of the troops who are coming up, regardless of all other considerations.

But the commander of a machine gun company must not get the idea into his head that it is his function to whip the entire body of the enemy alone and unassisted. If he performs his proper functions properly, he will have done all that can be reasonably expected of his command. If the campaign is in the aggressive condition indicated by a forward movement, it will be right to seize the position nearest to the enemy; if it is not seized, it will have to be taken later at the cost of lives. It will cost less to hold than to take by assault. Any other action on his part must be the result of special instructions. For example, it

may be desired to simply keep in touch with the enemy for some special purpose, or in a special case; in such a case the purpose of the commanding general may be best served by holding present ground, or even by holding the next favorable position in rear. But any such action will be exceptional, and governed by special instructions in each case. Ordinarily the business of the advance guard is to be aggressive. In the words of General Wheeler: "When we find the enemy, we must *fight.* We are out to hurt somebody, and expect somebody to get hurt; the best way to find out the strength and intentions of the enemy is to fight him wherever he can be found."

The advance guard is charged, more than any other body in the Army, with the duty of holding the enemy until an effective blow can be delivered by the main body. Hence it is to seize the most favorable position, and, in the general case, is to engage the enemy, not with a view of whipping his whole force, but for the purpose of making him stand and fight on ground favorable to our troops. A forward movement implies a desire to bring on an engagement. The advance guard must seize the most advanced and most advan-

tageous position, and hold it until relieved by the main body. The sound of its guns will be a signal for the main body to hasten forward.

A More General Type of Advance Guard Duty for Machine Guns.

The machine guns might act alone as indicated for the advance guard of a brigade or a regiment. The arduous nature of this duty makes it necessary to relieve men of it at frequent intervals, and that the tour of duty shall be as short as may be convenient. When acting with a brigade, the three companies of machine guns could be used alternately on this duty. It is to be remembered that advance guard duty is less arduous for a machine gun company than for one of infantry. It has its animals and guns, and can carry an amount of provisions and of conveniences that would be impossible to an infantry company. When contact is made, however, and the advance guard must dispense with fires and cooking, the duty becomes more trying. Then the infantry *must* supplement the machine guns, and the latter must alternate in order to obtain relief from the strain of constant vigilance, and in order to cook food. The case outlined above is an extreme one. Ma-

chine guns will rarely be called upon to perform advance guard duty alone. Their more typical use will be in conjunction with the infantry.

Advance Guard for a Regiment of Infantry Acting Alone.

In this case one platoon and one piece from the machine gun company will usually be a sufficient advance guard under ordinary circumstances. The infantry adopts the usual formation for this duty, with slight modifications to be noticed, and performs the duties of scouts and feelers. The reserve is dispensed with, and the machine gun marches with the support, except when concealment is especially desired. In this case it falls back to a convenient distance in rear, taking the place formerly prescribed for the reserve. The other two machine guns march at the head of the regiment, ready at all times to dash forward.

This assignment divides the regiment into twenty-four reliefs for the advance guard duty, and the machine guns into three reliefs for the same duty. No pioneers are needed for the machine guns; they are expected to go wherever it is necessary for infantry to go, at the same or a greater rate, and to do this without in any case delaying

the movement of the infantry, or putting the latter to any inconvenience.

Machine Guns with the Brigade Advance Guard.

When the brigade is acting alone and vigorously on the offensive, a strong advance guard could be formed as follows: One battalion of infantry, supported by one company of machine guns. The distances and formations prescribed in the manuals on the subject would form the basis of this advance guard, but the reserve is made of a single platoon of infantry and two guns. The third gun usually marches with the support, which comprises one and a half companies of infantry and the single machine gun. The other two companies move out by platoons to the right and left front, adopting the most favorable formations for the duty of concealment and resistance, each platoon sending out a section as feelers and scouts. If concealment or caution is demanded, all the guns may march with the reserve. Such an advance guard as this would be calculated to strike quick and hard; it would crush in the enemy's outpost or rear guard and probably bring on an engagement very quickly. On meeting his advance guard, it could usually take its choice of

position, and hold any desirable point against any force for any reasonable length of time.

This formation gives nine reliefs in the brigade for advance guard duty, and three in the machine gun battalion. But this is typical machine gun duty; routine duty for them, in fact, which they may be expected to perform as an ordinary thing day after day if necessary. Such is not the case with infantry; it will soon be exhausted by advance guard duty, unless frequently relieved.

A less promptly powerful advance, calculated to act with a greater degree of caution, could be formed by holding an entire company in reserve with all three of the machine guns, using two companies as a support, and one as scouts and feelers. The machine guns must always and at all times be equipped for this kind of duty, and ready to act independently if necessary.

Divisional Advance Guards.

These will usually be composed of all arms of the service, and the use of machine guns with them can be more readily appreciated after a study of the combined action of all the arms. It presents no problems different, however, from

those already considered. The primary function of the machine guns is to *support the contact line and to seize positions which will be important* for the security of the Army, or decisive in a forthcoming engagement.

The advance guard of the division, in the general case, will split into diminishing fragments toward the front, which will individually constitute local reserves or supports for the contact line of feelers. The natural place for the artillery is with the reserve of the main body; that for the machine guns, with the supports or reserves of the sub-columns. The machine gun performs a local part, the artillery a general part. The machine guns support the contact line, the artillery reserves its fire to overcome a fire from the artillery of the enemy, except in special cases, when it may be necessary to assist in fighting a superior force of the enemy's infantry or machine guns. Both arms are used as the exigencies of the situation may demand; but the differences of function here noted are inherent in the arms. Any attempt to disregard them will result only in defective use of one or the other arm, or both. The superior mobility of the machine guns will enable them to move with

ease from point to point and from one body of troops to another as occasion may demand.

The divisional complement of these guns is three battalions; a whole battalion could be told off to advance guard duty, from the brigade in advance for the day, or two companies might be sufficient. Its action must be subordinate to the plans of the division commander; and the major commanding the machine gun battalion, although technically under the command of the commander of the advance guard, must be fully acquainted with all the instructions, in order to enable him to use that intelligent judgment based on correct information which is so essential to the proper action of the machine gun arm. The degree of intensity of the engagement at first will depend most materially on the machine guns. If they are promptly put in, the enemy is likely to either retire or to unmask his main body in order to silence the fire of these wasp-like little adversaries. This, in turn, will lead to reinforcement of the advance guard, and to the opening of the ball.

The general rule may be here laid down that, in all duty with advance guard, the commander of the machine guns must be fully trusted by the

commander of the whole force, and made acquainted with all the information necessary for his complete guidance. It rests fundamentally with the machine guns whether the enemy is to be sharply pressed and strongly engaged, or merely touched lightly for the duty of security and information. Their superior mobility as compared with infantry, and their superior fire-action as compared with both infantry and cavalry, render them the weapon, *par excellence*, with which to force the enemy to make a stand at any time that suits the plans of the commander. If the machine guns are put in vigorously, the enemy must do something at once; and they can be put in at any time which the plans of the commander may demand. *The only limitation on this is that they must be handled by their own officers, who should know exactly what is expected of them, and when it is wanted.*

Aside from the value thus indicated, their fundamental value for the duty in question is that their use makes possible a great economy of infantry, both in numbers and in labor. This contributes directly to the fighting efficiency of the latter at the supreme crisis of the campaign. As herein laid down, the advance guard is reduced

from a strength of one-fourth as laid down by Wagner, Shaw, United States Drill Regulations, etc., to one-ninth or even a smaller proportion. This great saving of labor will react upon the infantry, promote the speedy and easy distribution of supplies, and contribute materially to the health of the command. It will very materially lighten the hardships of the campaign for the other arms of the service in this way.

With the Cavalry Advance Guard.

This will generally occur with cavalry on raiding duty, or with the cavalry division on screening duty. Both may be treated at once. It may be laid down as a general rule that the place for machine guns with the cavalry advance guard is with the reserve, except in case of very large guards, when the machine guns march with the local reserves. Their primary function is to strengthen the cavalry with what is, essentially, a powerful infantry fire. This operates to great advantage whenever infantry is encountered, or when contact is made with superior bodies of the enemy's cavalry. The use of cavalry as mounted infantry is not here considered. That case can be dismissed with the observation that such use of the guns

compares with infantry support by them, except as their action conforms to the superior mobility of the mounted infantry. In any such case the mobility of the machine guns is sufficient to permit of their use in any desired manner, according to the circumstances, governed by the ideas previously laid down, and by the special orders that may be given in each special case.

The cavalry advance guard operates as a veil, to secure information, and to seize important points. In the two first duties the machine guns are useful merely as an increase of fire-action, as a rallying-point, or as a stiffening of the screen. In the performance of the third duty cavalry may have to engage hostile cavalry or even hostile infantry. If the position to be seized is very important, it will be expected to occupy the key-point in spite of superior numbers, and to hold it to the last extremity for the main body. Gettysburg affords an example of the kind of action here referred to. Here the mobile fourth arm exhibits its usefulness in the highest degree. It will be a comparatively easy matter to mask their presence in case of a cavalry force, and to maneuver them into an advantageous position. They will thus

supply in the most effective manner that sharp, sudden, and concentrated fire which prepares the way in an instant for a successful cavalry charge. It will generally be practicable to maneuver the guns to a flank, or to maneuver the cavalry to one flank. A quick movement will unmask the guns, which will pour in a terrific fire for a moment, and then will be masked by the charging cavalry. The guns will at once dash forward to complete the work or to afford a rallying-point, under cover of which the cavalry can re-form.

In the Umatilla fight we have a perfect example of this kind of work. While a containing force held the hostiles in front, the guns galloped off to the right and poured in a terrific fire. The hostiles were thus dislodged, only to be struck by a cavalry charge from the left by a body of mounted cavalry which had been maneuvered toward that flank while the guns were taken to the right. These combined assaults demoralized the Indians, who fled to the pine woods for shelter. Here they were chased from tree to tree by the cavalry, now dismounted, and supported by the machine guns, which followed close on the advance. This action may be taken as an almost per-

fect type of the proper use of the machine gun arm with American dragoon cavalry. When operating with the cavalry screen, many such opportunities will be presented, with variations which can only be met as the cases arise. The essential thing for the machine gun commander to remember is that, in the attack, his work is subordinate to the cavalry; while, in the defense, the cavalry work is subordinate to that of the machine guns. The moment the cavalry is placed on the defensive it places its main reliance on its fire, and this is supplied by the machine guns. The cavalry in this case looks out for the flanks, and awaits the right moment to assume the counter-offensive. In every case the rule is to be remembered, that a sharp and effective fire upon the enemy is the most effective defense that can be made from attack, and that the same fire will inflict more damage upon a beaten foe, as long as he can be kept under fire, than any other punishment that he can receive. If his flight is disordered, it may be possible for the cavalry to charge in, but not otherwise.

QUOTATIONS.

These views of the use of machine guns, especially with cavalry, are strongly supported by Captain W. Anstruther Thompson, R.H.S., 1894. He says:

"The value of machine guns for purposes of defense is generally admitted among nations; but, as our cavalry drill-book so ably points out, these weapons can do far more than this, and there is now no reason to doubt that in taking part in a vigorous offense reliable machine guns will prove invaluable. Let them push out with the first line, if possible, wherever they may find cover, and dash out as opportunity offers, and take the enemy by surprise. The gun presents so small a target, it is so easily concealed, it is so quick, so mobile, and so deadly, that when properly handled it should be rarely captured or put out of action. Now and again, no doubt, one will be lost, but these dogs bite, and men and horses will think twice before attacking them, except under the most favorable circumstances; if they serve their purpose, it may pay to sacrifice them.

"The gun commander must keep his eyes open,

he must watch the enemy, and watch the ground and watch his own force too. He must choose his position well, and decide quick, and travel quick, for it is one thing to select a position and quite another to get there. He must be ever pushing on, taking every short-cut and advantage possible. He must always be 'there,' but never in the way. Cavalry machine guns should seize every chance, not only against cavalry, but against every other arm, especially against artillery.

"To sum up the whole matter, whether the gun is carried on horseback or on wheels, * * * * the same tactics will apply, and rapidity of movement is the great desideratum. Tell the gun commander the general idea, give him as free a hand as possible, and I predict that these guns, so far from being impedimenta, will be a welcome aid to cavalry. They are suitable alike for attack or defense, a useful auxiliary to every arm, and will prove themselves of a value hitherto undreamt of. As the improvement of modern fire-arms continues, so increases the importance of supporting our cavalry with fire. Here is a chance of carrying, so to speak, a battalion in our pocket. We have proved it can travel; we know it can shoot. It is

but a few weeks since it saved a British column from defeat. One of the enemy has described its effect. In his own words he says: 'It mowed us down.' What is there to prevent these ominous words from being applied to the battles of the future?"

As seen by the accounts of the more recent use of these weapons in the second chapter, they fulfilled exactly the forecast of their use made by Captain Thompson in 1894. At Santiago and at Omdurman the account is the same: They mowed down the enemy much as a lawn-mower cuts the grass on a smooth lawn. They were equally as effective against trenches and against heavy guns as they were against the mad charges of the Dervishes. They were as appalling to the trained Spanish forces as to the soldiers of Arabi Pasha, neither of whom would face the "machines that pumped lead." They were far more mobile than light artillery, even on the obsolete mount used at Santiago, and the tripod guns kept up with Kitchener's counter-assault without difficulty, and, as Colonel Roosevelt said of the Gatlings at Santiago, "were pushed fairly to the front of the fighting-line."

The following account of their use in the Tirah campaign, by the officer who commanded them, given in the *United Service Magazine* of London, is directly in point: "During the late Tirah War I was for four months in charge of two Maxims, which were converted from wheel carriages to tripod mountings, so as to enable them to go on the difficult ground traversed by the troops in the campaign. Although the mountings were made in the Public Works Department smithy, at Parachinar, with the materials at hand, and no lathe, and no sealed pattern, yet the detachment could bring the gun into action in seventy seconds from the time of the word of command to the firing of the first shot. I found that the mules could go anywhere a British soldier could go, and only once did we have to unload them (on account of an obstacle)."

If the Maxims could be thus used with a tripod carriage made as described, it is not unreasonable to expect a machine gun mounted on the latest improved field-carriage, capable of movement with equal facility by draft, by hand, or by pack-mule, to move equally well, at least. If the guns thus mounted could be brought into action in sev-

enty seconds, it would seem that the problem of rapidity of maneuver has been completely solved. Seventy seconds is hardly a sufficient time to enable the gun commander to make his preliminary observations. If the enemy's fire is too hot to permit this much delay, it will be necessary to seek another position. An assault in the face of so hot a fire as that would be impracticable any way.

Captain G. E. Benson, R.A., says: "*Machine Guns Acting with Mounted Troops.*—It is obvious, and has indeed been recognized in our service, that machine guns afford a welcome addition to the fire power of cavalry. Had the French possessed such a force, and had it been sent to St. Menges when news of the German advance on that side first arrived, the mouth of the Falisette defile might have been held long enough to enable the French infantry from Floing to come up. At any rate, the bold advance of the German artillery from this defile might have had quite a different result. Had Benedek possessed such a force at Königgrätz, it might have given him the means of checking the Crown Prince's advance sufficiently long to enable him to deal effectively with Prince Frederick Charles' army." This is testimony from a

very high authority on the subject, and, although part of it is mere conjecture, there can be little doubt, in the light of most recent examples of machine gun use, that Captain Benson is sound in his views.

Major Fosbury, of the English Army, advances the following views: "If a body of infantry forms the advance guard, it would frequently require the friendly aid of a Gatling battery to strengthen its fire at critical points, and two or more Gatlings would prove efficient auxiliaries to the field batteries usually so employed, on the acknowledged principle that with advanced guards the most reliable gun is that which is most effective against troops and which can carry most ammunition; for it has to go into action first and remain there longest. If cavalry move in front of an army and meet infantry, they are compelled to move back for protection; whereas, if associated with a Gatling battery and its attendant mounted riflemen escort, as suggested, important positions could not only be seized, but retained." Major Fosbury is an advocate of an escort of mounted infantry with each machine gun "battery"; in our service, with our dragoon cavalry, this need not be considered. Fur-

ther, it has been demonstrated that an efficient machine gun organization does not need an escort. In the organization we are considering each machine gun company can furnish its own mounted escort if desired. This will be still more a characteristic of the machine gun battalion.

From Shaw's "Elements of Modern Tactics": "Machine guns, when added to cavalry or mounted infantry, have a wide field of usefulness opened to them. In raiding operations they will always form an important addition to the force employed. In the attack upon or holding of advance posts, bridges, defiles, etc., these guns will be invaluable if properly handled. In the early stages of the attack upon a position, galloping machine guns can join in the advance guard action, keeping the enemy's cavalry in check and supporting the attacking cavalry. They will often be able, in conjunction with mounted infantry, to bring a flanking fire to bear upon advanced posts so as to force the garrisons to leave them. As the attack develops and the main body comes up, the infantry machine guns will engage the enemy's infantry, and also protect infantry and artillery from cavalry flank attacks."

Benson again says: "Attached to the cavalry division in front of an army, the value of such troops of machine guns (four guns each) is undeniable for holding important points seized by the cavalry before the infantry comes up, and for acting upon the enemy's cavalry just before the charge."

The organization adopted in this book will always lend itself readily to all the uses thus pointed out by experts, and in addition will be equally useful for the functions of the battle-field. The uses outlined do not cover all of the functions of machine guns with advance guards and with the cavalry screen, but enough is given to stimulate thought on the subject, and to indicate the general manner of their employment. The commander must never hesitate to "go in"; he can get out again more easily than any other arm, if such action becomes necessary, and his guns are easily disabled so as to make them useless to the enemy if their capture becomes inevitable. He must expect to lose some men, and sometimes to lose a gun, but "To make an omelette it is necessary to break some eggs." He must not sacrifice men or guns unnecessarily, but no considerations of

safety must prevent him from making the most effective use of them when the vital moment is presented.

CHAPTER VI.

MACHINE GUNS ON OUTPOST AND PATROL DUTY.

Outposts are primarily intended to afford security to an army. They form a cordon, or a series of detached posts as patrol bases, according to circumstances, and enable the main body to repose without fear of a surprise.

Their second duty, hardly less important than the first, is to establish a first line of resistance in case of attack. It is rarely judicious to encamp a force upon the exact line of resistance, because to do so would probably result in giving the enemy a correct idea of our dispositions. Neither is it wise to encamp in advance of the line, as this would make necessary a backward movement of the whole force in the very beginning of the engagement. Hence it is the usual custom to encamp slightly in rear of the actual fighting position, to occupy this position with the reserves or the supports of the outposts, and to throw out to the

front a number of sentinels, who become the eyes of the force for the time being. Ground which cannot be watched by sentinels is frequently patrolled. The details of the cordon system differ slightly from those of the Cossack system of outposts, but the general idea is the same; that is, the line of resistance is occupied by bodies of considerable size, which are covered by watchers still further out toward the enemy. The sentinels give warning of the enemy, and the larger bodies are relied upon to do the fighting of the outpost.

The third duty of the outpost is to obtain information, and this is effected by patrols which push out to a less or greater distance toward the enemy. Patrols are also used on the march, both in advance and in retreat, but the general conduct of a patrol is the same, whichever of these functions it may be momentarily performing. Patrols are a very important part of the defensive measures of an army, and sometimes of the offensive; but their management is distinguished only by the extreme latitude of action necessary for them. No fixed rules can be laid down and one treatment of the subject is enough. There is no necessity to divide them into a lot of arbitrary kinds, because they

are governed in every case by their special instructions, and are useful in direct proportion to the courage, independence, and enterprise of their commanders.

With Outposts.

The machine gun is a valuable adjunct to an outpost in the performance of all its duties. It increases the resisting power of these bodies, economizes the number of men necessary for the performance of this arduous duty, and enables a sharper degree of watchfulness to be kept up. It adds greatly to the security of the main body, and lightens the feeling of remoteness and helplessness which is always felt by any body of men who are separated from the main body and placed nearer to the enemy for the performance of this difficult duty. The habitual place of the machine guns is on the line of resistance; that is, on the line of reserves in the cordon system, and on the line of supports in the Cossack system.

Whole companies should be taken for this duty whenever the size of the force or the proximity of the enemy or the plans of the commander justify such action. In a small force, when there is only one company of machine guns with it, a single

piece would be the proper complement of an outpost. The pieces should be so located that they could be used—

1. To command all approaches, such as roads, paths, defiles, etc., to the position.

2. To command any neighboring ground from which the enemy would be able to either view or annoy the camp of the main body.

3. To sweep thoroughly all ground between the outposts, and to bring an effective cross-fire to bear on as much of it as possible. Much of the front can be cross-swept by their fire when several guns are used, if the machine guns be judiciously placed.

4. They should be prepared for instant action and should have an amply supply of ammunition at hand. It is to be remembered in this use of machine guns that, as they occupy the line of resistance, they will first be called upon to open fire, and will be in the position from which they will be used during at least the first part of the engagement. There is the additional advantage that if their ammunition be placed with them when they go on outpost, it will be there when the fight begins if the enemy should attack, and if the

machine guns do not need to use it, the cartridges will be available to supply the infantry. This will greatly assist in the problem of ammunition supply for the firing-line, admitted by all thinkers to be one of the greatest problems of the battle-field. This use of the machine gun ammunition was demonstrated at Santiago, where the Gatling gun limbers hauled ammunition for the firing-line and distributed it on the skirmish line under heavy fire.

5. They should be concealed as much as possible, and, when practicable, artificial cover should be used. This can be easily made if a few bags are carried with each piece. The bags can be easily filled with earth and laid to form a parapet in front of the guns. This, also, was demonstrated in action and on outpost duty. No cover is permissible which in any way obstructs a free field of fire. The best cover a machine gun can have is its own fire.

The outposts are established in the usual manner prescribed for this duty in the manuals on that subject, and as secretly as possible. After the positions for the guns are selected, they are taken forward as quietly as possible and located. It is a good plan to wait until the cover of dusk can be

had for this movement. The guns make very little noise, and can be taken anywhere in the dark if the ground has been viewed by daylight.

The commander of the machine guns must be fully informed as to the amount of resistance he is expected to make. In the general case he will occupy the line which is to be held by the main body in case of attack. He will in this case be expected to hold his ground until the deployment of the main body is completed, and the occupation of the position is accomplished. His guns will thus in the battle be distributed at advantageous positions, previously selected and occupied at leisure. His subsequent actions conform to the progress of the engagement for troops on the offensive or on the defensive, as the case may be.

The crews of machine guns on outpost duty remain intact, and under control of their own officers. They do not perform sentinel duty, nor ordinary patrol duty. A whole crew, with its piece, may be sent out as a patrol, or as part of a patrol, but the crews belong with their guns, and their first duty is to be always prepared to effectively serve their pieces on an instant's notice. In order to prevent undue fatigue of the gun crew, its com-

mander may detail a watch and permit the remainder of the crew to rest or sleep. Generally he depends on the outpost sentinels for warning, but there should be always at least one member of each crew on the alert, and the commander of the gun or of the company must satisfy himself of the necessity for firing in every case, by personal investigation, before opening fire, when on outpost duty. When the guns are acting on the defensive, in position, it is practicable for the commander to leave a larger degree of discretion to his subordinates, but the consequences of unnecessary alarms from outposts are so bad that the greatest care is necessary in not unduly putting the guns into action.

Machine guns on this duty open fire:

1. Upon the approach of the enemy in sufficient force to endanger the safety of the outpost.

2. When so directed, upon any considerable bodies of the enemy that come within range, such as patrols, etc.

3. When it is practicable to fire upon important officers of the enemy who may be making observations or reconnaissance of our lines.

4. In such other cases as may be the subject of special direction.

As a general thing, the fire of the machine guns is reserved. The one thing most desired by a machine-gun man is to get the enemy within range. There is no danger in permitting him to approach even in large numbers within short range, provided there is an open field of fire. Machine guns, especially when supporting each other by a mutual cross-fire, can not be "rushed." This never has been done, and cannot be done against guns well served by plucky men, who will coolly stand to their guns. A sufficient number of men cannot be massed in front of a machine gun to capture it by assault from the front, if it has a free field of fire of not less than 200 yards. The more men attempt it the more there will be to get killed. *Personnel* cannot live in the open in front of them.

Machine Guns with Patrols.

Patrols are bodies of troops sent out from the main body or from a fraction thereof, as from an outpost, for the purpose of making observations, of annoying the enemy, of making maps or sketches, of performing some specific work, or complying with whatever instructions may have been

issued. An advance guard may be regarded as one kind of a patrol, especially when it is small; the feelers it sends out in front and to its flanks are really small patrols, charged with the duties of observation and resistance; similarly even two or three men may constitute a patrol, or it may be made very strong and have one or more officers with it. They have been variously classified, somewhat arbitrarily, according to size, function, etc., as "visiting," "connecting," "expeditionary," "officers'," and so on. The student is supposed to be familiar with these classifications, and in general with the subject of patrol duty.

Connecting or visiting patrols will not ordinarily require the use of a machine gun as a component part of the patrol, but expeditionary patrols will find in them a valuable auxiliary. Such patrols will be able to venture out much farther into the enemy's territory, and to assume a much greater degree of boldness, when accompanied by machine guns. They can also remain out much longer, when necessary to accomplish their object. The amount of information gained or of damage inflicted upon the enemy will generally be in proportion to the distance penetrated

into the enemy's territory and to the length of time spent in exploration. The principal danger to such patrols was formerly that of meeting superior bodies of the enemy and thus being cut off. A small patrol with a machine gun need be under no apprehension of this in the future. It can throw any body of troops into such a state of disorder and confusion as to enable it to escape with ease. Its only fear is of meeting a superior body of the enemy armed likewise with a machine gun. In this case the patrol which first opens an effective fire will have a great advantage. Hence in this, more than in any other case, is emphasized the necessity and the extreme importance of having a very handy carriage, with an adequate supply of ammunition. In this case seconds count, and the side that can get its machine gun into effective action first will inevitably win out.

In the nature of the case a patrol accompanied by a machine gun will always be an officer's patrol. The commanding officer of the machine gun should be in command of the patrol, or should be made fully acquainted with all the instructions. With the addition of a machine gun to a patrol its timidity vanishes; the worst danger before it

is a lack of due caution. There will still be small patrols used solely to gain information, and not charged with the duty of resistance. These patrols use the utmost secrecy of movement, and would be hampered by the presence of a machine gun. They will be more likely to accomplish their work without than with the gun. But whenever it is desired to penetrate some distance without regard to resistance, or to seize a point, or to accomplish some specified work which is likely to be interrupted by the enemy, the machine gun will be valuable.

The formation of a patrol with a machine gun does not vary essentially from that of an advance guard except in size. It is preceded by feelers or scouts, and has its flankers well out. It moves cautiously, but as rapidly as possible, and trusts more to mobility than to concealment. It fights only as a last resort. Usually its machine gun will be carried in pack, unless the operations occur in a country where there are fairly good roads. If carried by draft, ordinary fences, hedges, ditches, etc., can be readily passed. The new guns and carriages are so light that a couple of men can easily carry the gun and carriage over an ordi-

nary obstacle without dismounting the piece at all. But when carried in pack, the gun can negotiate any ground that is practicable for a soldier on foot, at the same or a greater rate of speed, and can be brought into action as quickly as will ever be necessary. In either case, when coöperating with a patrol, the members of the crew remain with the gun; the duties of scouts and feelers are performed by the members of the patrol. When the gun acts alone as a patrol, some of its crew may be detailed for such action.

This outline of usefulness with outposts and patrols is not intended to be complete. The thousand and one cases that will arise must be met by those on the spot, and they must think out the situations as they are presented. For example: one of the most valuable uses of a machine gun on outpost is its quality of covering with precision a given field of fire at night. It can be laid in daytime, and then it remains faithful to its trust all night, without nerves, always true of aim. Again, in harassing the enemy it would often be practicable to locate the patrol gun at a convenient place concealed; then push the patrol into contact and draw an unsuspecting superior body of the enemy

under its destructive fire by simulated flight. The gun is admirably adapted to all kinds of stratagems, ambushes, and surprises. The opportunities for its effective use are limited only by the freedom from restraint, boldness, and ingenuity of its commander.

QUOTATIONS.

The remarks of Captain Thompson are so *àpropos* and sum up the duties of a machine gun commander so admirably that they will bear a repetition here: "The gun commander must keep his eyes open, he must watch the enemy and watch the ground and watch his own force too; he must choose his position quick, and travel quick, and decide quick." Skobeleff has been quoted in a former chapter on the "irresistible effect" of machine guns when used for the defense of bivouacs. This kind of duty is practically outpost duty, and the range and precision, mobility and simplicity of machine guns have been largely increased since that time, 1880.

The use made of them by Captain Litvinoff on the two occasions for which he is quoted was typical of advance guard and of outpost duty

respectively. Better examples could hardly be asked. Machine guns were used on outpost duty in the Santiago campaign, also; where the feeling of security given by this use to the soldiers was most marked. The advance from Baiquiri to San Juan was a type of advance guard duty as far as the machine guns were concerned. For an account of the use of the machine guns in this campaign the student is referred to the official report of the operations of the Gatlings.

Captain Rogers says: "Among these capabilities may be enumerated the acknowledged power of the Gatlings for * * * commanding roads, defiles, and bridges; for silencing field batteries or batteries of position * *." Major Fosbury may be again quoted: "If a body of infantry forms the advance guard, it would frequently require the friendly aid of a Gatling battery to strengthen its fire at critical points." Major G. S. Clarke, C.M.G., R.E., made the following observations in 1890: "As against surprise or night attack this is clearly a new weapon in the hands of the defender, of which it is necessary to take account. * * * In the special qualities of the automatic gun there is a distinct advantage to the

defense, arising from the fact that an intense frontal fire can be suddenly developed by a few sentries without waiting. * * *" It may be added to these remarks that the development of a flank fire is much more easily accomplished by a machine gun than by a body of troops. It can be maneuvered quicker, is more intense, more easily dirigible, and under better control. The duty of an outpost is a purely defensive duty. In such work the machine gun is the weapon *par excellence.* Advance guard duty is purely offensive, and the value of the machine gun for this purpose has been abundantly illustrated.

Shaw's "Modern Tactics": "Machine guns, when added to cavalry or mounted infantry, have a wide field of usefulness opened to them. In raiding operations they will always form an important addition to the force employed. In the attack upon or holding of advanced posts, bridges, defiles, etc., these guns will be invaluable if properly handled."

With the increase in range, simplicity, and mobility which has come since the above views were expressed by their authors, and since practical demonstration has been made of the use of

the machine gun on the offensive, there can be no question of the future usefulness of the arm on these duties. We should therefore be among the first to avail ourselves of them and should use them in a manner to develop their full power.

CHAPTER VII.

MACHINE GUNS IN BATTLE ON THE OFFENSIVE.

Machine guns, as organized herein, are expected to develop the fire action of good, unshaken infantry, plentifully supplied with ammunition, always under perfect control and fire discipline, and utterly without nerves. They will also be expected to have all the mobility of the best cavalry at all stages of the battle. When they get into so tight a place that animals cannot live for pack or draft, the men will be expected to draw the pieces by hand for a sufficient distance to render the use of animals again available. Usually this will not be necessary except in seeking a more effective position to enter the fight. If the guns reach so hot a place as the one supposed, they will be in an effective position. It must be always remembered that if the enemy can reach us with his small-arm fire, we can reach him with our machine-gun fire equally as well. We can therefore make the

machine guns effective wherever infantry fire could be used. Artillery fire is not to be considered. It is assumed that the machine guns will not be pitted against artillery at long ranges; it has been demonstrated that the machine gun has nothing to fear from artillery after it once gets within effective range. It can bring so effective a fire to bear that no men can live long enough to serve the pieces. But in the general case the enemy's artillery is silenced, or at least occupied by the artillery of the attacking force.

We have therefore to consider the zones of action in which machine guns will be useful in battle, and the particular objects at which their fire should be directed, as well as the tactical handling of the company in order to get the maximum degree of usefulness out of it.

THE ARTILLERY DUEL.

In the artillery duel which generally precedes a battle the machine guns will furnish the most effective escort for the artillery. The artillery is supposed to be pushed up to the front as soon as the preliminary reconnaissance of the enemy's position is made, and to occupy a selected position

from which it will perform two functions. It will first develop the enemy's artillery and endeavor to silence it or to so fully occupy it that the infantry will be relieved from its fire. Having done this, it will bring a fire to bear as effectively as possible upon the enemy's position for the purpose of covering the deployment of the troops of our own army. In performing these functions it will naturally attack any particularly strong positions in the enemy's line, such as a block-house, a detached fort, a strong redoubt, etc.

Two problems confront the artillery of our own side in the performance of this duty: First, it must select and occupy the most desirable position, and this in spite of a possible resistance of the enemy. Second, having done so, it must be maintained in this position, in spite of a possible counter-attack of the enemy, which may be delivered either in front or on the flank. It is not to be supposed that artillery will be so posted that it is liable to an attack in rear. The main body of the army is available to secure the rear at this stage of the attack.

The functions of the machine guns at this stage, therefore, are to support the artillery recon-

naissance, and to secure its position; then it must protect the flanks of the battery during the artillery duel, repulse any demonstration of the enemy without requiring the artillery to change its objective or cease its fire, and be prepared to defend the front of the battery if necessary against an infantry assault while our own infantry is in the stage of deployment.

The reconnaissance is usually made by the commander of the army assisted by the chief of artillery. The machine guns should precede the artillery in this, forming for all practical purposes a part of their escort while making the reconnaissance. This will probably extend beyond the advance guard, and the party will therefore be formed according to the principles of a patrol. The feelers will be pushed out sufficiently to guard against an ambush, and the whole expedition will be conducted with the utmost secrecy and caution. The great object is to get the artillery into an effective position from which it will be able to open a heavy fire at once as unexpectedly as possible. If, however, any opposition be made by the enemy, it is necessary to bring the machine guns into play and force a way far enough to accom-

plish the desired object. In making this reconnaissance the responsible officer who is to select the artillery position must push out with the foremost scouts, who take advantage of every cover and try to select the position without being discovered by the enemy. It is not necessary to push forward in this case with the celerity of the advance guard on the march. The rear portions of the party must hold well back and not expose themselves to view unless it cannot be helped. In the general case the terrain will afford some relief, and the position sought will be one which is on as high ground as practicable. The party will be on the reverse slope from the enemy, and the feelers will approach the top of the rise as cautiously as possible. Even if the enemy is watching for them, it may be possible to make the reconnaissance of the position without being discovered, so that the very position of the guns will have been selected before the battery tries to enter them to go into action. Such a place is selected with an eye single to effective artillery fire first, then to good defense, and, lastly, to divert the fire of the enemy's artillery from the line of approach of our own infantry. Whatever position be selected, the machine guns

should at once, and as cautiously as possible, seek to cover it. As a rule, they will be posted on the flanks of the battery, and in such a way, if possible, as to bring a cross-fire to bear on the front of the battery. The mere placing of the machine guns on the flanks is sufficient to insure them from an assault by the enemy. The machine guns need not be in the immediate vicinity of the battery. If they are placed at a distance of 200 or 300 yards to the flanks, so much the better; and if in addition to this they can be placed slightly in advance of the battery's position, the position will be admirable.

Having selected the position for the artillery, the next duty is to locate the places for the machine guns. The fundamental principle to be observed is to have a good field of fire, with as much freedom for movement to the front as possible. The machine guns will have to move before the artillery will, for as soon as the infantry passes the duel position the artillery is safe. It then has an infantry support, and no longer needs the machine guns. The selection of the supporting position for the machine guns can usually be left to the machine gun commander. He knows the

peculiar uses and powers of his particular weapon better than anybody else. All that is necessary is to indicate to him the position selected for the artillery, and inform him when the same is to occupy it. He will be expected to do the rest without any further orders. He is supposed to know his business, and to be ready to do his full duty.

The illustration given is typical of the case of one or two batteries of artillery. Usually that will be as many guns as will be concentrated in a single battery. The concentration of artillery fire does not demand the concentration of the pieces, but a singleness of objective. The time when the machine guns are to occupy the position in support will depend on circumstances. Usually they will take position at once, avoiding the fault of exposing themselves to the enemy's view. They should steadily avoid this during the whole artillery duel, unless it is necessary for them to unmask in order to open fire. During the artillery duel and the preliminary movements of the infantry, therefore, there is but little for the machine guns to do. If the artillery is strong and effective, as it should be for an army on the offensive, it will be the busi-

ness of this arm to cover the deployment of the army by long-range fire. But if the artillery be relatively weak, and an objective be presented within 2500 yards, it will be possible for the machine guns to assist in covering the deployment by long-range fire. Usually they will not be put into action at long ranges. The proposition of long-range machine-gun fire has been ably discussed, but the artillery is the proper arm to perform this function. The machine guns can take the place of an infantry support for the artillery, but they cannot perform the functions of that arm as well as it can do them.

In support of these views we quote:

Benson says in regard to the offensive uses of machine guns: They will be used—1. "To economize the infantry by securing the front in conjunction with the artillery against counter-attack, thus enabling more troops to be used for turning movements." 2. "To supply long-range infantry fire."

Rogers says: "The commander of a machine gun battery should know from habitual experience how best and most judiciously to give effect to the general directions he may receive for his guidance, but he should endeavor to keep out of fire until the

moment for action is evident to his trained senses. Finally, he must, while seeking all immunity from artillery fire, in reality so despise it as never to be diverted from the main object of his presence on the field of battle—viz., the prompt slaughter of men and horses."

Lieutenant Pratt, R.A., says: "Suppose one of these (Gatlings, model 1873) drawn by two horses was attached to a battery; it would be escort enough in itself. With two-horse wagons for ammunition, the addditional impedimenta to an army would be trifling, and I think this weapon, owing to its mobility and efficient defensive power, would be the most effectual escort to the artillery of the future."

Shaw says: "As the attack develops, and the main body comes up, the infantry machine guns will engage the enemy's infantry and also protect the infantry and artillery from cavalry flank attacks."

Benson may be quoted in regard to long-range machine-gun fire as follows: "There is a very important difference in the effective ranges of the rifle and the machine gun when the former is handled by large bodies of men, which are very difficult to

control in extended order in the excitement of battle. Machine guns can, from the control under which they can be held, open fire with effect at ranges where a very large proportion of the infantry ammunition would be wasted. * * * They should be used in conjunction with whatever arm happens to play the most important part in the different stages of the fight: with the cavalry in the preliminary stage, with the artillery to protect their flanks in the preparatory stage, with the infantry during their advance and assault, and again with the cavalry for the pursuit or retreat."

Enough has been quoted to show that some of the ablest writers and tacticians agreed with the foregoing views, even before the actual test of battle had demonstrated their correctness. The use of the guns as a support to a battery of artillery was demonstrated at Santiago, where the Gatlings were placed as a support to Grimes' Battery when it first went into action. In this case, however, the position specifically ordered, in rear of the battery behind the hill, was the worst one that could have been selected. The Gatlings caught the artillery fire that came over the hill, and it was not advisable to open with them, as

they were reserved for another purpose. They remained, however, until a sufficient force of infantry had passed to secure the flanks and front of Grimes' Battery, before they were withdrawn from their dangerous position. They were not used for the long-range fire, because they were reserved to enter the fight at the more critical stage immediately preceding the assault, and to occupy the captured position as a reinforcement to the troops which made the charge.

THE SECOND STAGE OF THE ATTACK.

When the enemy's artillery has been silenced, or fully occupied by our own, the infantry begins its forward movement. The general case will present a diversified ground, under cover of the folds of which the columns of infantry will approach until their losses warn them to deploy. This deployment will generally begin at from 2000 to 1500 yards from the hostile position, ranges at which the fire of the best infantry will be of doubtful utility. But, owing to the superior steadiness of the machine guns, their fire can be made useful at these ranges. The machine guns which have

not been used as an artillery escort will have reached this position ahead of or with the infantry. As a general thing, some feature of the ground will present an opportunity for them to take an effective position so that their fire will go over the heads of the advancing infantry. The enemy is likely to be on ground somewhat elevated, and there may be some position a little higher than the ground on which the troops are advancing. In this case the fire of the machine guns will be perfectly safe for our own troops. But in the extreme case, where the terrain is entirely unfavorable, the trajectory itself will make the machine-gun fire safe. When the pointing levers are in the hands of men who are familiar with the trajectory, and the troops are handled with ordinary coolness, there will not be the slightest danger of hitting our own men from this fire. The fire of artillery over the heads of troops has the disadvantage that fuses will not always act as they are expected to do. Sometimes they burst short, and in this case the effect is extremely demoralizing upon our own men. Besides, they always know, necessarily, when artillery is firing over their heads, and fear the effect of a weapon

they do not understand. But they all understand what the machine-gun fire is, and they need not know it is firing over their heads unless it is desired that they should. They cannot be demoralized by something of which they are ignorant. Again, it is not always necessary to fire over their heads. There is not a solid front of infantry at this stage of the fight. There are gaps between the columns and between the sections. Into these gaps the machine guns of the brigades and the ones relieved from the duty of supporting artillery can be pushed abreast of or ahead of the infantry, and from these positions they can often bring a destructive fire to bear on the enemy. It must not be thought that these guns will keep up a continuous fire, that they will go on for an indefinite time pumping a solid stream of lead at one place, as some of the opponents of machine guns seem to think in their discussions of the amount of ammunition used by the guns. Such targets are but rarely presented, though they do show up for a few minutes at a time. When a target is presented, the machine gun whirls around and cuts in; as soon as its target disappears, it at once takes advantage of its superior mobility to catch up with

the infantry and seek a new place to go in. The machine guns will thus cover the advance of the troops as the battalions are split into companies and the companies into sections on the approach to the position. This part of the advance, down to about 800 yards, may even be made without the aid of the machine guns at all. But there comes a time when the force of the propulsion is seemingly exhausted, and the infantry struggles to maintain itself in an effective position. It is not ready for the charge, for the deployment is not completed, and its reserves have not yet come up. Sometimes when they have been thrown into the fight it is all that the infantry can do to hold its own. Here begins the third stage of the attack, which must be decisive one way or the other. If our infantry is repulsed here, it will be practically wiped out before it can again cross the beaten zone under a combined small-arm and artillery fire, probably assisted by the enemy's machine guns. But if it can make a successful advance of a few hundred yards from this position, it will carry the works of the enemy and have him under the same murderous conditions during his flight. Whichever way the battle turns at this point will

mean a decisive moment for the troops of one army or the other.

MACHINE GUNS IN THE THIRD STAGE OF THE ASSAULT.

Here is presented the opportunity, the supreme moment for the machine guns. With his attention fully occupied by the threatening infantry, and perhaps under a constant fire of artillery, the enemy will be so fully occupied that the machine guns can dash forward to the very front of the infantry firing-line and throw their intensity of fire into the scale. It will even be possible for them to dash beyond the skirmishers themselves, and to take the enemy practically by surprise. They are now within probably 600 or 800 yards of the enemy's intrenchments, and the results of their murderous fire are plainly visible to the unassisted eye. The enemy either drops to the bottom of his trenches to seek shelter from the storm, or he runs away. In the first case, his return fire at once becomes so inaccurate that it ceases to do any damage; in the second, the works are ours, and the machine guns, with the infantry, play on his back as he runs, while fragments of the troops run

forwards and occupy the position, opening at once on him from that point.

It goes without saying that the machine guns may suffer heavily at this forward move to the most advanced line. But the enemy is not concentrating his fire on them during the dash forward. The machine guns will have been worked forward during the advance of the troops until they will have to cover a comparatively small space of ground during this final dash. It takes only a moment, and once they have reached the front of the battle line they have the power to silence any return in short order. The destructive effect of machine guns coolly handled at close range is frightful. The moral effect is even greater. When the enemy finds that every man who exposes his head above the trench to fire receives a bullet in the head, it produces a panic. This is the auspicious moment for the delivery of the infantry charge. Under good management, the fire of the machine guns can be kept up practically until the moment just before contact. Even if it is necessary to elevate the guns and to fire over the whole line, the moral effect of the continuous rattle of the guns, which have made so vivid an impression

so recently, will be enough to give our troops a great advantage at this critical moment. The obvious thing that all three of the arms of the service—infantry, artillery, and machine guns—may be pounding away on the same place at the same time is only alluded to that it may be noted here how effective the assault may be, and how well it can be prepared before it will be necessary to risk any troops in the attempt to come to hand-to-hand work. If the enemy is obstinate, however, this is the last resort; and the machine guns alone make this possible without terrific loss of life, and then only when they are handled with coolness, skill, and good judgment.

MACHINE GUNS OF THE RESERVES.

Meantime the brigades that have been held in hand by the commander as a protection to the flanks, and as a general reserve, will be ready to throw the weight of their power into the scale as soon as the result of this last desperate effort is seen. If it be successful, it will be their duty to take up the pursuit of the defeated enemy; if he has merely retired to a second position, it will be their duty to reinforce the firing-line and to con-

tinue the assault, if a continuation of it is to be made. In such a case, if there are fresh troops available, it is a promising thing to send them in, and push the assault to the last extremity. But if this be not desirable for any reason, then these troops and their machine guns will reinforce the firing-line and secure it with a body of fresh troops against a counter-charge. The machine guns which participated in the charge will probably have exhausted their ammunition, and will need a chance to reorganize their crews and to recuperate. They will then take the place of the other guns in reserve. If the enemy is to be pressed, the machine guns which accompanied the charge to the captured position will fire upon him from that place to the end of their ammunition, or as long as a good target is presented. The machine guns which were held out of the charge will take up the pursuit as soon as it is known that a pursuit is to be made, and push on from position to position, regardless of whether there are any other troops engaged in the pursuit or not. At the best condition of the enemy, the machine guns can take care of themselves; they can surely do so when they are fresh and are pitted against a defeated and

exhausted enemy who is retiring in a disordered condition. Here the cavalry machine guns come into the most effective play. It is most important to press the enemy at this time in order to prevent the formation of a proper and effective rear guard. Cavalry alone might be stopped, or at least balked, by a small force of determined infantry; but cavalry with an effective force of machine guns would walk and run over such a force, and would make a pursuit like that after Nashville a regular thing after every defeat.

Another feature of the tactical use of machine guns in the attack of positions will be its use in turning movements. It may be used in either of two ways: with the containing force, or with the turning force. Every attempt at a turning movement is but another tentative attack in a new direction. If it develops into an attack, the machine guns will be used as described in the attack. If it results only in a demonstration, no arm can make as heavy a demonstration to the amount of force engaged as the machine guns. If used with the containing force, a small number of machine guns will be able to do what formerly required a large body of other troops to effect. A small force

of infantry to give the appearance of an infantry attack, with the fire-action supplied by the machine guns, will make a powerful demonstration, and at the same time one that can be pushed if the circumstances are favorable. Similarly, a small force of infantry for display, with a force of machine guns to give the fire-action, will make a sufficiently powerful containing force for any ordinary occasion.

The orders to be given to the machine-gun men at the beginning of the battle need not be very explicit. The commander of the machine guns should know where the real point of attack is, and should be kept well informed of the progress of the action. With this information, he should be able to get into action in an effective manner on his own account, and is likely to do better when not hampered by orders than when compelled to try to comply with instructions laid down probably by an officer who does not understand the true *rôle* of the machine gun in the battle. A very high grade of talent is demanded in order to be thus able to cut in alone, but a high grade of talent is demanded for the service of the machine gun at any time. The following quota-

tions from eminent soldiers and experts on machine gun service will serve to illustrate the text, and to prevent the charge of too great a degree of originality in the foregoing discussion. They will show that some of the finest soldiers in the world, both living and dead, have agreed with these ideas, even when they were still a subject of simple speculation. Every one of the foregoing uses of the new weapon has been exemplified on the battle-field. It is no longer an experiment; it is no longer a guess to say that machine guns *may* be able to do this or that: *we know* that these things can be done, for they *have been done* in civilized warfare, against good veteran troops well supplied with ammunition, in the best of intrenchments.

QUOTATIONS.

Benson summarizes one use of them as follows: "They will advance into the captured position at the heels of the attackers and by their steady and controlled fire will be invaluable for firing on the retreating defenders or for beating off a counter-attack by the reserves. At such stages of the bat-

tle, the range being short, their fire will be most deadly, and, quickness in coming into action being a great desideratum, they ought to have the advantage of artillery in this respect."

Hamley says: "Many cases must arise in war in which the long ranges of the field-gun would be superfluous, while the mitrailleuse could be employed under its own conditions of effectiveness. In all countries not absolutely flat, troops may often engage with no greater distance than 1200 yards between the hostile forces."

Rogers says, anent the requirements of officers of machine guns: "Gatlings require the utmost intelligence, the most skillful handling, the readiest resource, the highest courage and the best tactical genius that can be drawn to their service."

Hamley says again: "I think it is indisputable that, provided two forces otherwise equal are face to face, and the one that attacks can succeed in bringing up a line of machine guns at such a distance as to bear effectively upon the enemy's position, an immeasurable advantage will be gained in thus covering the otherwise very difficult attack of infantry."

Anderson has this to say: "Just as certain-

ly as the needle-gun gave to the Prussians a decided advantage in the campaign of 1866, so will an intelligent and bold use of machine guns operate in favor of the nation that first uses them in a future campaign. The terrific power developed by these weapons effectually silences all detraction from their value as implements of war, while military writers speak of them with respect, but remark that some solution as to their efficiency and adaptation to the field tactics of the present day is necessary. The advantages hoped for from the addition of machine-gun fire to that of the weapons now in use are: *(a)* A murderously powerful fire. *(b)* Relief to the infantry in furnishing them a powerful support and one admitting of their withholding their fire till the last moment. *(c)* Increase in the volume of fire. As regards the first of these points, there can be no two opinions of the terrific power of the weapon if accurately laid and worked; while in respect to the second, machine-gun fire fills up a blot in our tactics in that long-range fire may be carried out by them, allowing infantry to advance to the attack taking advantage of all cover and without firing, and enable them to achieve what

military writers and past wars show to be of the utmost importance—viz., the retention of the infantry fire till the last moment." This book is an attempt, assisted by a careful study of the subject, to furnish the tactical study which Anderson has here pointed out as the one thing needed for the complete establishment of the machine gun in its rightful place as a weapon of the future.

Major Smith, R.A., says: "When the supreme critical moment of the engagement takes place, when it is a question of moments whether the attacking or the defending infantry is to retire, that is the very time when the machine guns may gallop up, place themselves if necessary in the very midst of the shooting alignments, and render most overwhelming moral and material aid."

General Gordon wrote in his diary a few days before his death at Khartoum, and left it to his countrymen as the last priceless legacy gathered as the result of a lifetime of experience in warfare: "Against a good mitrailleuse and a sharp operator with a good telescopic sight, no gun could be served with impunity at 2000 yards range, although it could be served against artillery force; for at that range there is plenty of time to dodge,

under cover after seeing the flash ere the shell arrives."

All these predictions have been verified by actual use in warfare against civilized troops, on a premeditated plan of action prepared months in advance. This plan was filed with the Adjutant-General of the United States Army six months before the battle of Santiago, and was there carried out to the letter. The following quotations from the document so filed six months in advance will be interesting, as showing that the use made of the machine guns in that battle was not accidental, but proceeded on well-thought-out lines and in a predetermined manner. A thing may be valuable as the result of an accident; but if it is the result of calculation, and agrees with the calculations exactly, all doubt is removed.

"It is claimed that a machine gun mounted on this carriage can be carried with a firing-line of infantry on the offensive, over almost any kind of ground, into the decisive zone of rifle fire, and to the lodgement in the enemy's line if one be made.

"On broken ground the piece can be moved forward by draft under cover of sheltering features of the terrain to a position so near the enemy that

under cover of its fire an infantry line can effect a lodgement, after which the piece can be rushed forward by a sudden dash.

"In case of a counter-charge by the enemy, the superior weight and intensity of its fire will shake the enemy and so demoralize him that in all probability a return counter-charge will result in his complete discomfiture."

Again, at Tampa, Florida, in the beginning of the campaign, the officer who successfully used the machine guns went on record as to his intentions in using them as follows:

"This organization is expected to develop: *(a)* The fire-action of good infantry. *(b)* The mobility of cavalry. Its qualities, therefore, must be rapidity and accuracy, both of fire and of movement. Its employment on the defensive is obvious. On the offensive it is expected to be useful with advance guards, rear guards, outposts, raids, and in battle. This last use, novel as it is, will be the most important of all. The flanks of the division can be secured by this organization, relieving the reserves of this duty. It will give a stiffening to the line of support, and at every opportune occasion will be pushed into action on the firing-

line. The *moral effect* of its presence will be very great; it will be able to render valuable assistance by its fire (over the charging line) in many cases. Last, but very important, the occupation of a captured position by this organization at once will supply a powerful, concentrated, and controlled fire, either to repulse a counter-charge, or to fire on a discomfited, retiring enemy. Being a horsed organization, it can arrive at the vital moment when, the defender's first line having been thrust out, our line being disorganized, a counter-charge by the enemy would be most effective, or controlled fire on him by our own troops would be most useful.

"It is urged that this last use of machine guns is one of the most important functions, and one that has been overlooked by writers and tacticians."

Starting with these clearly defined ideas as to the work to be accomplished by machine guns, every one of them was fully demonstrated to the fullest limit of the opportunity presented. No clearer a demonstration was ever given of a mathematical problem in a section-room, following an enunciation through a logical demonstration to an

inevitable conclusion, than was here presented in an arduous campaign of the propositions thus laid down.

The hints thus thrown out will, it is hoped, stimulate thought in regard to the part that the machine guns ought to play in the other thousand and one incidents of the battle-field. It is neither possible nor desirable to lay down a set of hard rules to govern the commander of the machine-guns. Give him free rein, tell him as much as is advisable of the plan of battle, and keep him posted; then expect him to do the rest. Expect him to be "up and coming" at every stage, and take no excuses if he is not. In this manner we can get the fullest possible results from a machine gun company, and the organization laid down will lend itself in every particular to this kind of free action by the necessary subordinate commanders.

CHAPTER VIII.

MACHINE GUNS ON THE DEFENSIVE.

In operating on the offensive the qualities which most distinguish this arm from others are its mobility and its fire-action. On the defensive it is distinguished by its fire-action and its ease of concealment. Its extraordinary fire-power is the same in either case; but the assailant must necessarily expose himself, thus depriving himself to a great degree of the peculiar adaptability of the gun to the purposes of cover. He seeks to neutralize this disadvantage by rapidity of movement, passing with celerity from point to point; the defender, on the other hand, relying upon his artillery for all long-range work, seeks to keep his machine guns concealed for the last desperate assault.

POSITION.

The defensive implies the choice of position, and a certain degree of preparation. The length

of time required to lay out and construct shelter trenches is so small that there can be no doubt these defenses will form part of even the most hastily arranged plans of resistance in the future. These lines will necessarily conform to the natural elements of the position, and will present one or more series of more or less broken and irregular lines. The position will be usually so taken as to afford a certain amount of relief above the ground over which the attacking force must pass, and will in the general case present salients and reëntrants. As to the relative advantages of these points for locating one or more mchine guns, it may be noted that a gun placed in a reëntrant may command by a flanking fire two lines of trench, and will be better sheltered from the observation and fire of the enemy. This leads to an economy of guns and of men. On the other hand, a gun located at a salient reaches the enemy sooner and has a much greater field of fire. It is more exposed to capture, but may do more effective work. The timid commander, awaiting an attack, would choose the reentrant; the bold one, seeking to make a vigorous counter-offensive, would prefer the salient for his guns.

A judicious distribution of the guns, when there are plenty of them, would place them not only at both of these points, but would also place them at frequent intervals along the lines. The space taken on a trench by a machine gun is so small, compared with the superior fire developed. that the only limit to their use is in the number available. Their superiority consists as much in their greater accuracy as in the greater intensity of their fire. It is not merely that they can expend a large amount of ammunition, but that they can do so at the critical time, upon the exact place desired; and also that the point of aim, as well as the intensity of the fire developed, is always under perfect control. They have no nerves, and they never shoot wild or get stampeded. There is also the great advantage that the infantry can be held in reserve to make the counter-attack, at the point best suited for this demonstration, and not exposed to the severe losses of an exposed firing-line.

Every defensive position has points that are more or less easily approachable by the enemy; points which are endangered by the presence of some protecting feature favorable to his approach. This will always be the case except when the

defender occupies an ideal position, in which case it is not probable that there will be any attack. Such places of a defender's works should be particularly well supplied with machine guns, in order to make the attack of these points as costly to the enemy as possible. The crews of the guns should be organized into reliefs, and there must be always a sufficient number of men at the gun to effectively serve it. The number laid down in the organization planned will answer this purpose, as it is not necessary to have as many men at a gun in trench as when serving it in the open. The ammunition supply in trench is easier kept up, whole boxes of it being placed in the trench with the guns, convenient to hand. The remainder of the men are kept under cover near at hand, always ready to jump into the trench at a moment's notice. It is a good plan to have bayonets for these men as a moral encouragement in case of a desperate hand-to-hand conflict. The rifles are also useful sometimes for sharpshooting work, where it is not desirable to turn a machine gun on for this purpose. It is to be remembered that the right way to meet like is with like; so the way to

fight sharpshooters is with other and better sharpshooters, not with machine-guns.

FIRST CONTACT.

In the preliminary encounters of minor detachments with similar bodies of the enemy, the machine gun would be used as described for advance guards, patrols, etc. They serve principally to make the enemy's attempts at reconnaissance as costly as possible, and to strengthen those contact bodies which harass and continually worry his forces. The policy of allowing the enemy to approach undisturbed to within short rifle range, practiced by the Spaniards at Santiago, is admissible only in case of extreme weakness, or as a stratagem to draw the enemy within reach. In that case, had it been followed by a vigorous blow from the rear, it would have resulted in severe losses to the American Army, either in a costly assault, or by starvation or by disease. The Navy did not force an entrance into the harbor, and the stubborn valor of the Spanish troops might have held on indefinitely if any encouragement had been received by assistance from outside sources. For

such a demonstration, a small force in the mountains, with light machine guns, would have been especially well adapted. It is not incredible that forty or fifty resolute men, with a pair of guns that could be carried from point to point, might have made the road to Siboney so unsafe as to have seriously embarrassed the American Army, and perhaps have compelled it to either assault or retire. So, also, it might have led to an assault by the American fleet on the harbor, and to a possible loss of one or more vessels. The exasperating thing about that affair to General Toral must have been that he never had a chance to get his enemy fairly engaged after the first day, except at awful disadvantage to his own men. The Americans would not take by assault what they well knew must surrender without the serious losses that would have been incurred by it, and the Spaniards were not strong enough to forego the advantages of their intrenchments to make any more counter-assaults. The presence of a small body of aggressive Spanish troops with a few machine guns in the rear of General Shafter's army, threatening his line of supplies, would have made either an assault or a retreat necessary. In such

raids against lines of supply as those practiced in the Civil War, machine guns are fitted to give an amount of stamina to a raiding force that will make it far more effective than heretofore.

THE BATTLE.

The defender can avail himself of the mobility of his machine guns as well as the assailant. He usually has better routes of communication from part to part of his line, and can generally transport his guns from place to place under cover. In this way he will exaggerate to the enemy the strength of his defenses, and may be able to turn the tide of conflict at critical times in several different places with the same guns. When pushing the pieces into action at new points, it should be done with as much regard to concealment as possible, so as to give the effect of surprise whenever that can be done.

If the enemy be pushed back, it should be the invariable rule to seek to push a company of machine guns forward, on his flank if possible, to accelerate his retreat and increase his losses. This will tend also to demoralize his men. If, on the other hand, it be necessary for the defender to retire, the

retreat should be covered with heavy returns made by the machine guns. These returns should be pushed as stubbornly as possible. There are few things calculated to more effectually dampen the ardor of a pursuing enemy than to encounter a sudden blast of machine-gun fire, and there is no device capable of inflicting a greater check in proportion to the force engaged. Such returns should partake as much as possible of the nature of an ambush, and should be pushed to the last moment. The pieces should then get away as rapidly as possible, only to repeat the same operation at the next favorable opportunity. The pieces can get away all right if they move with celerity, and even if they do not escape, they may perform services so valuable that their loss will be a good investment. There is none of the stigma attached to the loss of a machine gun that formerly clung to the loss of a field-piece. The machine gun is essentially a weapon for short ranges and hot work; it is more than probable that one will be sacrificed from time to time. The gun commander should be held accountable for as vigorous and stubborn a resistance as possible; he must not risk his pieces unnecessarily, but on proper occasion he is bound to

put them in, regardless of losses of either men or guns, and fight them to the last moment, knowing that they will be taken, but that the emergency demands the sacrifice. In such a case he must see that his pieces are disabled before they fall into the hands of the enemy. Luckily, this is easily done in the case of all machine guns, so there is no excuse for their falling into the hands of the enemy in a condition to be useful to him, unless all the members of the crews are killed first. Tacticians agree that the sacrifice of cavalry and of artillery may be justifiable; why not that of machine guns? They can inflict a greater loss, in a shorter time, and with a smaller force.

VILLAGES.

In the defense, as in the assault of villages, the function of the machine guns is to sweep the streets. Their use enables either party to pour a terrific fire in the desired direction, while exposing the minimum number of men. They cannot batter down walls, but they can disperse mobs and clear streets of all opposition. When either side is driven to take refuge in houses, it becomes so split up that cohesion is thereafter impracticable.

The party that secures and maintains control of the streets is the victor, for it can act in bodies and under control, and can defeat the fragments of the other party in detail. In defending a village the attempt is made to apply the principles of defending a defile. If the avenues can be so closed that the enemy must take a given direction or street, this should be done, and the machine guns so concealed as to command it. They are admirably suited to embrasure-work, and can be so perfectly concealed in this way as to greatly increase their usefulness. In the general case, the defender's artillery would occupy the outskirts, while his machine guns would be located at interior points. They are used to beat back entering parties, and can fight from position to position, and from house to house when necessary. The guns can be used with any arm of the service, or they are capable of taking care of themselves alone.

QUOTATIONS.

Benson summarizes their uses on the defensive as follows:

"1. To sweep defiles, roads, command debouches of woods and defiles, and to flank *points d'appui* of the main line.

"2. Well-horsed machine guns always ready to dash out at any favorable opportunity and inflict damage upon the enemy, with the power of speedy withdrawal.

"3. A reserve of well-horsed machine guns to be always in hand to succor hard-pressed points before infantry can come up."

Colonel C. B. Brackenbury, R.A., in his book on "Field Works," in speaking of the defense of villages, advises the use of machine guns as follows: "If there be no central position, something of the kind can be formed by barricades, and here, whatever be the nature of the post, will be the place for the machine guns, if any are available. * * * * * * It is almost impossible to overvalue them for street fighting, providing that they are light, manageable by hand, and so mounted that they can be taken into and out of houses without difficulty. Their place would be in the keep and behind the barricades. The general rule, liable to exception, should be: Let the defenders keep their

field guns outside and their machine guns inside the village."

Rogers enumerates the following uses of the machine gun on the defensive: "Among these capabilities may be enumerated the acknowledged power of the Gatlings for the defense of intrenched positions and villages, for commanding roads, defiles, and bridges, for silencing field batteries or batteries of position, for increasing the fire of infantry at critical moments, and, finally, of supporting field batteries and protecting them against cavalry or infantry charges."

Major Sydenham Clarke, C.M.G., R.E., in his work on fortifications, adds a few other points. He says: "In the special qualities of the automatic gun there is a distinct advantage to the defense, arising from the fact that an intense frontal fire can be suddenly developed by a few sentries, without waiting for the complete manning of the parapet by the garrison. As against surprise or night attack, this is clearly a new weapon in the hands of the defender, of which it is necessary to take account. The machine gun, on account of its unique power of instantly bringing a heavy continuous fire, controlled by a single brain, upon

a given target, will prove especially effective by night against working parties, and the defense can employ the electric light with little difficulty. The extreme mobility of the machine gun will enable it if well handled to obtain great results in each of the modes of employment above referred to, and the necessity of shutting it up in a fixed position where it may be disabled before firing a round, and where the man who fires it can never really know what he is shooting at, will rarely exist."

In "Sea-Coast Defenses of the United States," by General H. L. Abbott, late Chief of Engineers, United States Army, we find the following remarks: "Machine guns will play an important part in defending such a system of works against assault. They concentrate within a small space the fire of whole regiments under the old system; they may be withdrawn from view, and be made safe from capture at a small expense; and, lastly, they avoid the necessity of providing bomb-proof quarters for a large garrison."

These quotations from eminent authorities open up consideration of a field of usefulness for machine guns that is foreign to the scope of this

work. That they have a place in every permanent fortification is self-evident to every thinking military man. But it is not considered essential to a consideration of the field uses of the guns to enter into a discussion of that subject, which is important enough to demand a separate work by itself.

CHAPTER IX.

REACTION ON TACTICAL SCIENCE.

This review of the tactical employment of machine guns in the field would be incomplete without some notice of the training necessary for officers and men of the corps, and some forecast as to the influences upon the tactics of the other arms of this new factor in warfare.

INFANTRY.

The problem of controlled infantry fire at critical moments has been the bugbear of the modern tactician. It is not too much to say that the work of the machine guns in the assault on San Juan Hill at Santiago solved that problem. The infantry deployed under cover of the woods and of their own fire, and the increase of controlled fire necessary to obtain the ascendancy at the critical moment was supplied by the powerful battery of Gatlings, which went into action 100 yards in front of the infantry at the moment of "rapid fire,"

and played with dreadful accuracy upon the trenches of the enemy until the instant preceding contact. These few minutes have always been a stumbling-block to tacticians, many of whom have insisted that troops must be kept in close order to obtain the necessary control of their fire-action. This will no longer be insisted upon, in the future.

The machine guns will be relied upon at all ranges from 1500 yards down to supply whatever controlled fire may be necessary at any particular juncture. True, the infantry will still fire, and its fire will still be "controlled" fire, in a certain sense. The expenditure of ammunition will still be jealously guarded, but its fire-action will be primarily for the moral effect on our own advancing line, and only in a secondary sense to increase the destructive fire-action of the machine guns upon the enemy.

It will no longer be necessary to attempt the concentration of infantry fire. Whenever a concentrated fire is required upon any objective, one or more machine guns will be put into action, and the infantry will direct a general fusillade at the whole front, upon whatever local target may be presented.

The function of infantry has been radically

changed. Instead of being the fire-weapon of the commander, as heretofore in recent times, it will be returned to its ancient and honorable status as the *contact weapon.* This is the most radical revolution that has ever been accomplished at any one time in the history of tactical science. It is one that must be at once considered by all tacticians, in order to meet the changed conditions of the battle-field. It is the lesson of the last war, and one that must be conned until it is thoroughly learned.

This change of function involves a corresponding change of tactics for the infantry arm of the service. The latest previous problem was how to maintain cohesive fire-action in the fire-swept zone. The new problem is to pass through the danger zone as rapidly as possible, firing as little as possible, and then mass as heavy a line as possible at the most favorable position for the final charge. During this advance, all *concentrated* fire-action will be supplied by the artillery and the machine guns, principally the latter. The infantry will be permitted to indulge in local firing, at local objectives, for moral effect; but the great weight of its fire will be reserved for the more critical time just

before the final assault, and the infantry will be urged forward across the danger zone to the final position with very little fire-action. Its losses will be in exact proportion to the length of time taken to traverse this distance, and to the efficiency or inefficiency of the two supporting arms. From the final position, the overwhelming weight of rapid infantry fire at short range will be added to that of the machine guns, and at the last moment before actual contact the latter will cease to fire, only to dash forward into the captured position, from which they will renew their b-r-r-r-r, while the disorganized line is prepared for future action.

The future tactics of infantry will present problems as follows, and in the following order: 1. Cover. 2. The rapid fire. 3. The hand-to-hand assault, which latter will be the real one of all, and most important.

The solution of the first problem entails the most open order of advance practicable. The second means careful training in short-range rifle-firing, and the last one foreshadows the return of the bayonet as one of the most important weapons of infantry. The fire-action of infantry, no longer requiring concentration, will need control only to

prevent exhaustion of ammunition. The local leaders will designate local objectives, and the commander of the regimental or battalion firing-line will regulate the expenditure of cartridges by the simple process of commencing or ceasing the fire. The complex and numerous commands and signals of our present system will be abandoned, to be succeeded by only two—viz., "commence" or "cease" firing. This, in practice, will be reduced to one signal bugle call, which shall mean to cease or commence firing according to circumstances. If the troops are firing, it will mean to cease; if not firing, it will mean to begin. The designation of ranges and objectives will be a purely local affair, and will be done theoretically, as it now is practically, by the local officers of the firing-line.

These are not mere conjectures; they are simple statements of what actually occurred in the battle of San Juan Hill. This is what takes place in a modern battle, whatever artificial system may be built up in drill-books. The makers of drill-books will be compelled to conform to these ideas, because they are now common property. The line

of the service will demand a practical drill-book, and will get it—when they write it themselves.

The problem of the advance will be that of cover; and this, in turn, will be that of extended order, now made possible of solution because it is no longer complicated by the problem of fire-action. The advance being directed upon a selected point, it will naturally concentrate a heavy line at that point for the final assault. It is a fundamental principle that the attacker wins if he makes a single effective lodgement. He assails the enemy's whole line with fire, but he assaults only at a single point. Here he must bring an overwhelmingly superior force, aided by an overwhelming fire-action, and armed with the bayonet for the moment of contact. While this decisive assault is delivered he must overwhelm the rest of the enemy's line with machine-gun fire. Having made a lodgement, he must rush forward the machine guns to make possession of the captured point secure. The degree of success thus obtained will depend upon the importance of the point thus captured, the available force to secure it, and the available force to press the advantage thus gained.

These changes in tactics foreshadow a corre-

sponding change in organization and training for the infantry. The arbitrary unit of eight men will probably have to be abandoned, and there will be a return to some more simple company organization. The training in rifle fire, especially that at short ranges, must be perfected, and great stress will be laid in future on the estimation of distances. So, also, the training of the infantry in the use of the bayonet, so much neglected in recent years, must be resumed, and each soldier must be made proficient in bayonet fencing. The enemy will no longer be able to escape from his trenches by flight. The storm of machine-gun fire will compel him to seek cover, and to remain under cover until the moment of contact. This, in turn, will lead to hand-to-hand-fighting, and to a renewed life for the bayonet as an effective weapon for the infantry arm of the service. Actual contact occurred at both San Juan Hill and at El Caney.

ARTILLERY.

The tactics of artillery will be modified to even a greater degree. In the case of this arm, not merely its tactics and organization will be vitally affected, but its *matériel* must be remodeled to

conform to the new tactical requirements of the artillery service. The shorter ranges being now barred to the artillery, the extreme degree of mobility heretofore demanded of it will not in future be necessary, and it will be practicable to so modify the carriages and sights as to insure greater accuracy of fire. If the primary use of artillery and its fundamental tactical principle is "to hit," then we must have telescopic sights and recoil buffers. It will be also practicable to increase the caliber of field batteries. We may therefore expect at no very distant day to see the 3.6-inch gun adopted as the principal weapon of the artillery arm, to be used generally for purposes of demolition and for long-range firing. The need of mobile guns for the cavalry service will be supplied by light pieces, similar to mountain guns, and by machine guns. The artillery must cease to be considered as a factor in short-range work, and will endeavor to supply by a superior degree of accuracy the long-range fire necessary to aid in covering deployments, to knock down block-houses, to destroy walls or intrenchments, etc.

The conditions of the cavalry service, as now understood, will not be materially modified by the introduction of machine guns.

DEDUCTIONS.

To insure the full development of these ideas it will be necessary to call the best talent into the service of the new arm. The pioneers in all fields of human endeavor must be men specially fitted for what they are to do. Hundreds are competent to do what has been once done, but few are competent to originate. The machine-gun man must understand fully all the tactical uses of all the other arms of the service, and the exact relation and usefulness of his own in relation thereto. He must have the keen eye that takes in at a glance the salient points of a battle, and detects with unerring certainty the critical time and place. He must have the finest combination of nerve, patience, audacity and determination, and be prepared to fight always "to the last breath of horse and man." No part of the service demands higher qualities.

QUOTATIONS.

Captain M. E. Carthew Yorstoun, 4th Bombay Cavalry, an officer of great experience with machine guns, has thus described the qualifications and training of a good machine-gun man: "We do not ask a railway porter to drive a locomotive. Intelligent non-commissioned officers and men may easily learn to lay, load, and fire the gun, and may even attain to some technical knowledge of the machinery; but to instantly grasp the cause of a 'jam' or stoppage, put it right, look after the bearings, or replace a broken part requires a higher mechanical training: we require experts for this, and to obtain them I would suggest that from each regiment a few specially selected officers and non-commissioned officers, together with a few men (if possible, selecting men who are machinists by trade), be put through an advanced course of machine-gun instruction, and examined from time to time that their knowledge may be kept up to concert pitch. The superficial course at present taught at our musketry schools is not sufficient; some of the instructors themselves have not the requisite knowledge of the subject. Guns should

be invariably in charge of officers and non-com missioned officers who hold machine gun certificates; make that a rule, and do not grant the certificates too easily, and the major difficulty of instruction is overcome. The course I suggest would embrace: (1) A complete knowledge of the mechanism of the guns. (2) The causes and prevention of stoppages and jams. (3) The tactical uses and misuses of the guns. (4) The care of the guns, saddlery, harness, horses, etc. (5) The elements of stable management, saddle-fitting, and harness-fitting. (6) Rapid laying, range-finding, experimental shooting, etc."

These excellent suggestions of Captain Yorstoun practically cover the subject. We must, in other words, train both officers and men in the special functions of their special arm of the service, in order to get the best results. In addition to this, we must also train the officers in the tactical uses of all the other arms. Hence our officers should have a technical course on machine guns, and our men a technical drill.

Captain Rogers says: "Gatlings require the utmost intelligence, the most skillful handling, the

readiest resource, the highest courage, and the best tactical genius that can be drawn to their service."

Major Anderson, R.A., takes the same view: "All important in the utilization of machine guns is that they be placed in the hands of intelligent men who have been given sufficient opportunities of knowing and practicing with the weapons, in order to derive full value from them and save reckless waste of ammunition."

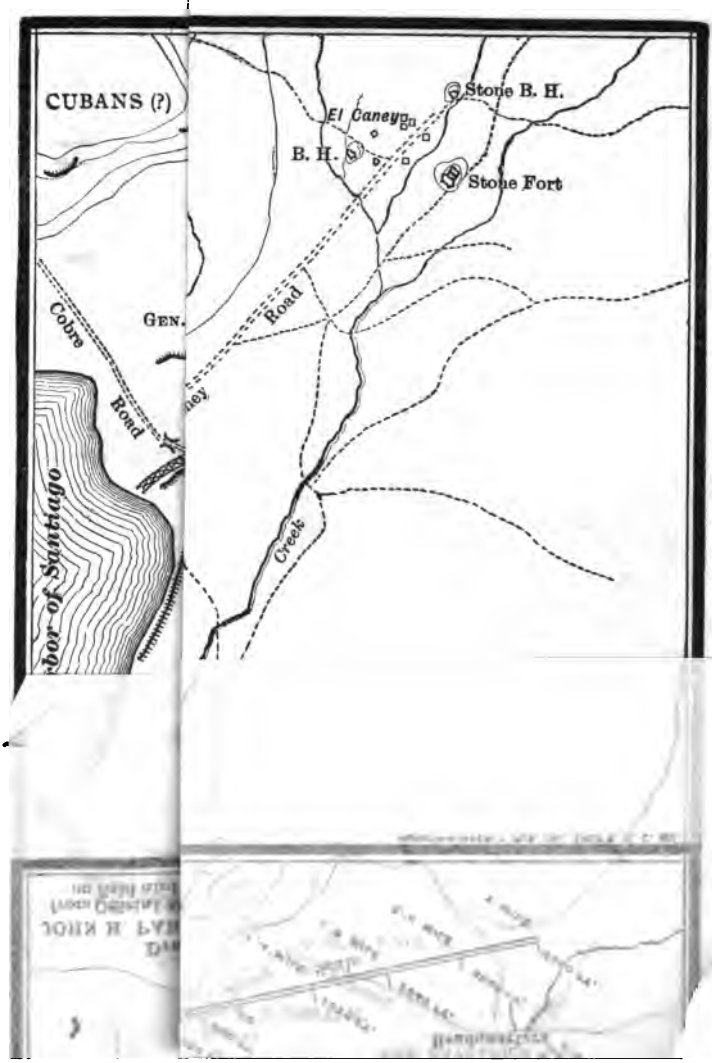
CONCLUSION.

Some of the qualities required by these writers are only inherent, and some can be developed as a result of careful study, drill, and preparation. Drawing the practical lesson from this for our own service, it is that there should be inserted in the course of study at the Military Academy a good course on machine guns. There should also be a second course given to selected officers at the various schools of application. In addition to this, companies of machine guns should be distributed at all regimental and battalion posts, and should participate in all battle maneuvers. Whenever larger bodies of troops are formed in camps of

instruction, or in actual campaign, the proper complement of machine guns, properly organized, should be provided and should participate in all exercises above the school of the company.

In this way all troops will become accustomed to the tactical coöperation of the different arms of the service, and unity of effort in battle will be secured by training in time of peace on correct tactical lines.

THE END.


CUBANS (?)
El Caney
Stone B. H.
B. H.
Stone Fort
Cobre
Road
Road
Creek
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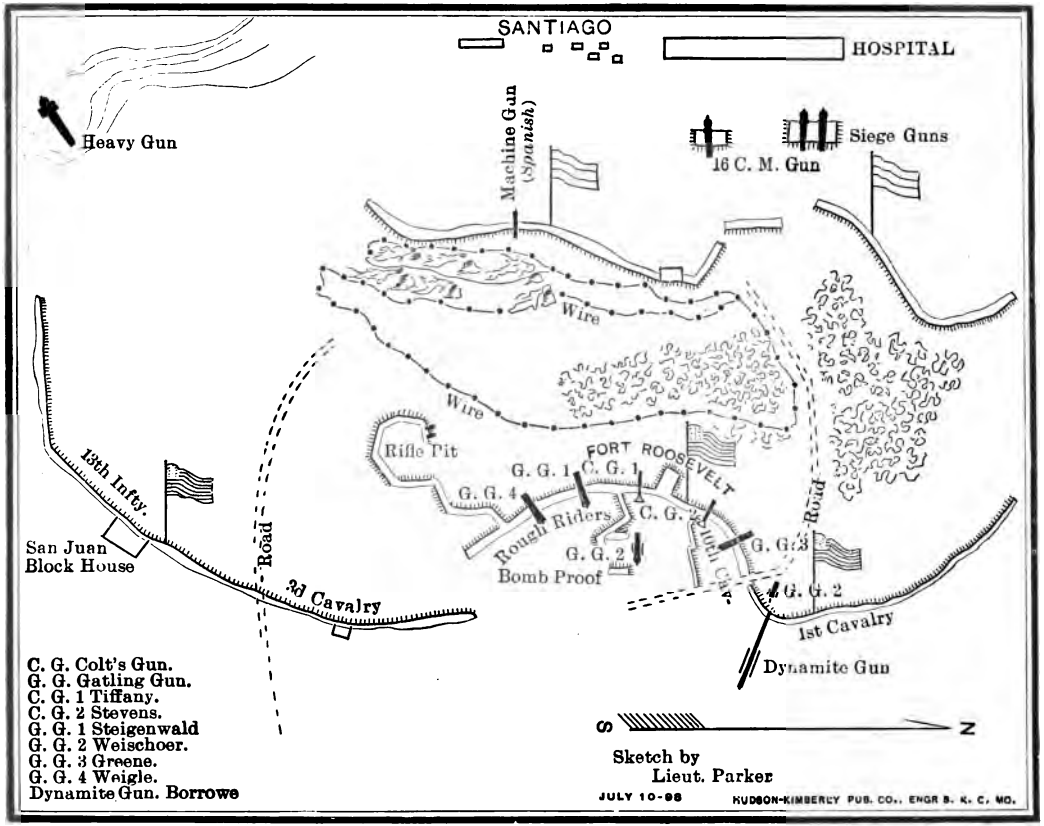
CITY OF
SANTIAGO


SANTIAGO
HOSPITAL
Heavy Gun
Machine Gun (Spanish)
16 C. M. Gun
Siege Guns
Wire
Wire
Rifle Pit
FORT ROOSEVELT
G. G. 1
C. G. 1
G. G. 4
Rough Riders
C. G.
G. G. 2
Bomb Proof
G. G. 3
Hutch Cal.
G. G. 2
Road
13th Infty.
San Juan
Block House
Road
3d Cavalry
1st Cavalry
Dynamite Gun
S
N
C. G. Colt's Gun.
G. G. Gatling Gun.
C. G. 1 Tiffany.
C. G. 2 Stevens.
G. G. 1 Steigenwald
G. G. 2 Weischoer.
G. G. 3 Greene.
G. G. 4 Weigle.
Dynamite Gun. Borrowe
Sketch by
Lieut. Parker
JULY 10-98
HUDSON-KIMBERLY PUB. CO., ENGR. K. C., MO.

APPENDIX.

Bivouac, near Santiago, Cuba,
July 23, 1898.

The Adjutant-General U. S. Army, Washington, D. C.

Sir,—In compliance with orders I have the honor to submit the following report of my command, the Gatling Gun Detachment, 5th Army Corps, covering its operations down to the present date:

1. Organization.—Pursuant to instructions from Gen. Shafter I was given a detail of two sergeants and ten men on the 26th of May, 1898, from the 13th Infantry, then in camp near Tampa, Fla., and directed to report to 1st Lieut. John T. Thompson, O. D., ordnance officer, Tampa, "for duty with Gatling guns." I was placed in charge of four guns, model 1895, cal. 30, and at once began the instruction of the detachment. On June 1st I received verbal instruction to assist Lieut. Thompson in his work at the ordnance depot, and performed this duty in addition to my duties with the guns until June 6, 1898, superintending issues to the expedition (5th Corps) then fitting out for Cuba.

On June 6th I took my men and guns aboard the transport *Cherokee*, and on June 11th, per special orders No. 16 of that date, my detail was increased to thirty-seven men, all told, of whom one was left sick in hospital at Tampa. About twelve of these did not join me, however, until after debarkation at Baiquiri, Cuba. On

June 25th I received verbal instructions from Gen. Shafter to disembark at once, select the necessary number of mules (two per gun), and get to the front as soon as possible, reporting on my arrival there to Gen. Wheeler, then in command of all the troops at the front. I was unable to obtain any tentage for myself, and had only shelter-tents for my men.

I was joined on June 25th by Capt. Henry Marcotte, 17th Infantry, retired, regularly authorized correspondent of the *Army and Navy Journal*, who has been with me ever since, enduring all the vicissitudes of the season with Spartan fortitude, although equally destitute of cover as myself and 60 years of age. I desire to express here officially and fully, my sincere gratitude for the kindness which permitted him to accompany my command, and the great appreciation of the valuable advice and assistance which he has given continually. His large experience of war, his clear head and good judgment have always been at hand to aid, and his cool example to myself and my men under fire did much to steady us and keep us up to our work when we were first called on to face that ordeal.

All of the detachments, who had not previously joined me, did so on June 26th, on which day I reached the extreme front and reported to Gen. Wheeler. The guns were posted in a position to sweep the neighboring hills toward the enemy, and I went into camp, remaining there until the morning of July 1st.

Summing up the organization, it should be stated here

that the detachment was organized at the first, and has ever since remained an independent command, receiving its orders directly from the corps commander. It has had its own records, returns, rolls, etc., and has been rationed separately all the time, and is composed of men selected by myself from various regiments.

2. The Battery in Action.—On the morning of July 1st, I broke camp at 4:30 a. m., and pursuant to instructions from Gen. Shafter, proceeded to El Poso, placing my battery, as I shall henceforth call it, in support behind the position taken by a battery of artillery. I took this position about 6 a. m., and soon after the artillery arrived, went on to battery and opened fire at Santiago, the range being 2,600 yards. After some time the enemy replied with a well-directed fire, the second shell bursting directly over my battery in rear of artillery. Neither my men nor mules showed any signs of disturbance, and we remained in our perilous position nearly twenty minutes, the enemy's shells bursting all around us, until ordered to the rear by the chief-of-staff. The battery went to the rear under fire quietly until out of range, and remained there until the artillery fire ceased, at about 9 a. m. Private Hoft, Company D, 13th Infantry, a member of the detachment who had been detailed to guard the camp equipage at El Poso, remained at his post during the whole of the artillery fight, and deserves great credit therefor, his battery having been ordered to the rear.

At 9 a. m. I returned to El Poso, and there received the following instructions from Col. McClernand, A. A.

G., 5th Corps: "Find the 71st N. Y. V. and go on with them, if you can. If this is not practical, find the best position you can, and use your guns to the best advantage." Pursuant to these instructions, I went forward about a half-mile and found the 71st N. Y. V. halting to learn what their instructions were. I could get no clear idea of what they were going to do, but waited about fifteen minutes in their rear to find out. Meantime troops continually passed us toward the front. Then, about 10:15, firing began in front. I rode forward alone along the road, which was a narrow defile through the jungle, and found that about a half-mile in front was a creek, upon the crossing of which the enemy's fire seemed concentrated. In front of this crossing seemed to be a level plain of about 400 to 800 yards, beyond which was a semi-circular ridge crowned with Spanish trenches from which the Spanish fire seemed to come. Men were being hit continually at this place (the ford), but it seemed to me to be a good place to work my battery effectively.

I rode back, finding the Seventy-first still lying beside the road without any apparent intention of moving. I determined to leave them and go into action. Taking a gallop, I moved the battery forward nearly to the ford (about 150 yards), where I met Col. Derby of Gen. Shafter's staff, who informed me that the troops were not yet sufficiently deployed to take advantage of my fire, and advised me to wait. The bullets were cutting through all around, and, as we learned afterward, the enemy's sharpshooters were actually in the woods near us, up in tall

trees, picking off officers and men. It should be stated here that the sudden increase of the enemy's fire at this time was caused by a wild cheering set up by the 71st N. Y. V., as the battery passed them on its way to the front. The cheering located our position for the enemy and drew his fire. Many a brave soldier who had gone to the front was put forever beyond the possibility of cheering by this outburst of ignorant enthusiasm.

I acted on Col. Derby's advice, and he promised to send me word when the moment for proper action came. This was necessary, as I knew only part of the plan of battle and might have jeopardized other parts of prematurely exposing our strength at this point. The gun crews lay down under their guns and steadily remained at their posts. The fire finally grew so hot that I moved about 100 yards back. This was about 12, noon. At 1 p. m., or about that time, I received a message sent by Col. Derby, I think, as follows: "Gen. Shafter directs that you give one of your guns to Lieut. Miley, take the others forward beyond the ford where the dynamite gun is, and go into action at the best point you can find." I obeyed the order, giving Lieut. Miley Sergeant Weigle's gun and crew and moving the rest forward at a gallop to the point beyond the ford, which I had already selected as a good place. The battery opened with three guns simultaneously at ranges of 600 to 800 yards at 1:15 p. m. The enemy at first concentrated his fire upon us, but soon weakened and in five minutes was clambering from his trenches and running to the rear. We fired as rapidly as possible upon the groups thus pre-

sented until I saw a white handkerchief waved by some one of my own regiment, the 13th Infantry, and at the same moment Capt. Landis, 1st Cavalry, who had voluntarily assisted me throughout, said: "Better stop; our own men are climbing up the ridge." I ordered the fire to cease at 1:23½ p. m., and a moment later saw our own troops occupy the crest of the hill. The firing had been continued by the battery until our own troops were within 150 yards of the enemy's trench, a fact made possible by the steep slope of the hill upon which the enemy had been.

At the time when my battery went into action I had no support, and the position I took was at least 100 yards in front of any of our troops along this part of the line. About the time I ceased firing, Lieut.-Col. Baldwin, 10th Cavalry, put two troops in support of my battery.

I have advanced in a letter to the Adjutant General from Fort Leavenworth, dated January 1st, 1898, the theory that such guns as these can be used offensively. The conditions of this assault were favorable, the morale of my men superb, and the use made of the guns followed the theory therein set forth with the exactness of a mathematical demonstration. The infantry and cavalry had been pounding away for two hours on these positions; in eight and one-half minutes after the Gatlings opened the the works were ours. Inspired by the friendly rattle of the machine guns, our own troops rose to the charge; while the enemy, amazed by our sudden and tremendous increase of fire, first diverted his fire to my battery, and then, unable to withstand the hail of bullets, augmented

by the moral effect of our battery fire and the charging line, broke madly from his safe trenches and was mercilessly cut by fire from these guns during his flight.

I at once limbered up and took stock of my losses. One man was killed, one badly wounded, one mule hit twice, but not much injured, and several men were missing.

Suddenly the fire was resumed at the front. I moved my three pieces forward again at a gallop, and went into action on the skirmish line on top of the captured position, with two pieces to the right and one to the left of the main road from El Poso to Santiago. I was compelled to make the skirmishers give way to the right and left in order to get room for my guns on the firing-line, and to impress stragglers to carry ammunition. Capt. Ayres, 10th Cavalry, gave me a detail of one sergeant and two privates, all of whom did fine service. It seemed to me that the enemy was trying to retake the position. About 4 to 4:14 p. m. I saw a body, apparently about 400, of the enemy to the right front of my position, apparently in front of the position occupied by Lieut.-Col. Roosevelt with the 1st Volunteer Cavalry. I turned a Gatling gun on them, using 600-yard range, and they disappeared. Soon after the firing sensibly slackened.

In the rapid fire on this last body of the enemy I had overheated one piece, and it went temporarily out of action. I went over to Col. Roosevelt's position, about a quarter of a mile to the right of a salient, and reconnoitered. While there Sergeant Weigle reported to me with his piece, informing me that Lieut. Miley had not put it into

action, and asked for instructions. This was about the hour of 5 p. m., and the fire became warmer at that moment. I directed Sergt. Weigle to run his piece up on the firing-line and to report to the officer in charge thereof. He did so and went into action at once. Col. Roosevelt, who was and remained present, informs me that the gun was very effectively used. I rejoined my other two guns and put both of them on the line at the left of the El Poso road. At sundown the enemy made a sharp attack, and all three of my guns were effectively used. During the fight a battery in the city opened on my two guns, firing 16 cm. shells. I at once turned my guns on it and kept up so warm a fire that the cannoneers left their battery and did not return. In all they had fired three shells at us, all of which broke just over or beyond the battery. I secured the fuse of one, still warm, and after the surrender visited the battery which had fired at us and examined the gun. It is a 16 cm. (6.2992 inches) bronze rifle gun in barbette on a pintle. This is probably the first time in land fighting that such a piece was ever silenced by machine-gun fire. The range I used was 2,000 yards (estimated).

The guns were used during the remainder of the fighting in the trenches. I took off the wheels and put the guns on the carriages in emplacements, erecting a sandbag parapet in front as cover during the night of July 4th. The disabled gun was brought up and repaired, subsequently participating in the fighting. The dynamite gun, under Sergeant Borrowe, 1st Volunteer Cavalry, co-

operated with the battery thus formed, and the whole battery, including the two Colt automatic rapid-fire guns under Lieut. Tiffany, 1st United States Volunteer Cavalry, did good work in all the subsequent fighting. I supplied about eight thousand rounds of captured Mauser cartridges to Tiffany, which had been captured by my battery, and which he used effectively in his Colt's guns. I had a strong fire directed upon a battery of seven pieces of the enemy's artillery at a distance of 1,500 yards in front every time any attempt was made to use this battery. The result was that only three shots were fired from these guns after July 4th. I visited this battery after the surrender and found every gun in working order, the 16 cm. gun being actually loaded. As no organization, except my battery, of which I had general direction, had such orders, so far as I can learn, the conclusion is that this battery of machine guns kept out of action seven pieces of the enemy's artillery by making it too warm for his gunners to stay in their batteries.

I have made certain recommendations in hasty reports for gallantry, which I personally witnessed. They were as follows:

Capt. J. R. F. Landis, 1st Cavalry, medal of honor. Volunteered to assist observation of fire July 1st, and rendered great service at imminent peril of his life made necessary in order to render such service.

Sergeant John N. Weigle, 9th Infantry, 2d Lieutenant U. S. Army (regulars). For conspicuous daring, intelligence, and coolness in action, July 1st.

Corporal Charles C. Steigenwald, 13th Infantry, 2d Lieutenant U. S. Army (regulars). For coolness and judgment in keeping his gun in action with only one man to help on July 1st.

Private Fred C. Elkins, 17th Infantry, 2d Lieutenant United States Volunteers. For conspicuous daring and courage in action. Although wounded, he remained at his post until he fell from exhaustion, July 1st.

Corporal Matthew Doyle, 13th Infantry, medal of honor. Conspicuous gallantry and coolness in action. When two men had been shot down by his side he continued to work his gun effectively alone until assistance arrived, July 1st.

Sergt. Green, Company H, 13th Infantry, medal of honor. Conspicuous coolness and steadiness in handling his piece under hot fire, July 1st.

Sergt. John Graham, 10th Cavalry, medal of honor. Conspicuous coolness and steadiness under fire, July 1st.

Sergt. Weischaar, Company A, 13th Infantry, certificate of merit. Particularly meritorious steadiness, night of July 6th. Being put on outpost duty with a Gatling gun in time of truce, and having been alarmed by a sentinel, whose duty it was to warn him of the enemy's approach, he coolly reserved his fire for personal investigation and prevented a violation of the truce.

Sergt. Ryder, Company G, 13th Infantry, certificate of merit. Particularly meritorious steadiness, night of July 6th. Being on outpost duty with a Gatling gun in time of truce, and having been alarmed by a sentinel, whose duty

it was to warn him of the enemy's approach, he coolly held his fire for personal investigation and prevented a violation of the truce.

In making these recommendations, I have limited myself to those which I personally observed. If I recommended for every deserving act, there is not a man in my whole detachment who has not deserved a certificate of merit. They were selected in the beginning from an army corps for what I knew of them, and they have abundantly justified my confidence in them. With a less efficient personnel it would have been absolutely impossible to oragnize, equip and instruct the first battery of Gatling guns ever used in the history of war, in the short space of time allotted me, and put it in efficient fighting shape. They fought their guns on the skirmish line and in advance of it, standing boldly up to do it when the skirmishers themselves lay down close for cover. My loss, as footed up on the night of July 1st, was 33 1-3 per cent. killed, wounded, and missing. The efficiency of the work of my guns was attested to me by numerous Spanish officers and prisoners. Their favorite expression was: "It was terrible when your guns opened, always. They went b-r-r-r-r, like a lawn mower cutting the grass over our trenches. We could not stick a finger up when you fired without getting it cut off—so!"

The work of this experimental battery proves that in this weapon we have a new arm supplementary to infantry and cavalry, independent of both as one arm is of another, and more nearly capable of independent action

than any other arm of the service. It is equally demonstrated that this new arm is entirely different from artillery in its functions, and can live where the latter is compelled to retire.

It should, therefore, be organized as a separate arm. I have, at the request of General Wheeler, drawn up a scheme of such an organization and submitted it to him.

Experience shows me that the carriage is too heavy. I can only renew the representations contained in my letter of January 1, 1898, to the Adjutant General, accompanying drawing, etc., of my proposed carriage for machine guns. I would now, based on experience, modify my theory of oragnization as then proposed, and would make several changes in the model of carriage then proposed without departing from the general principles.

If any expression of such views is desired, I shall be very glad to submit them when called upon by the War Department to do so.

Very respectfully,

John H. Parker,

2d Lieut., 13th Infantry,
Commanding Gatling Gun Detachment, 5th Corps.

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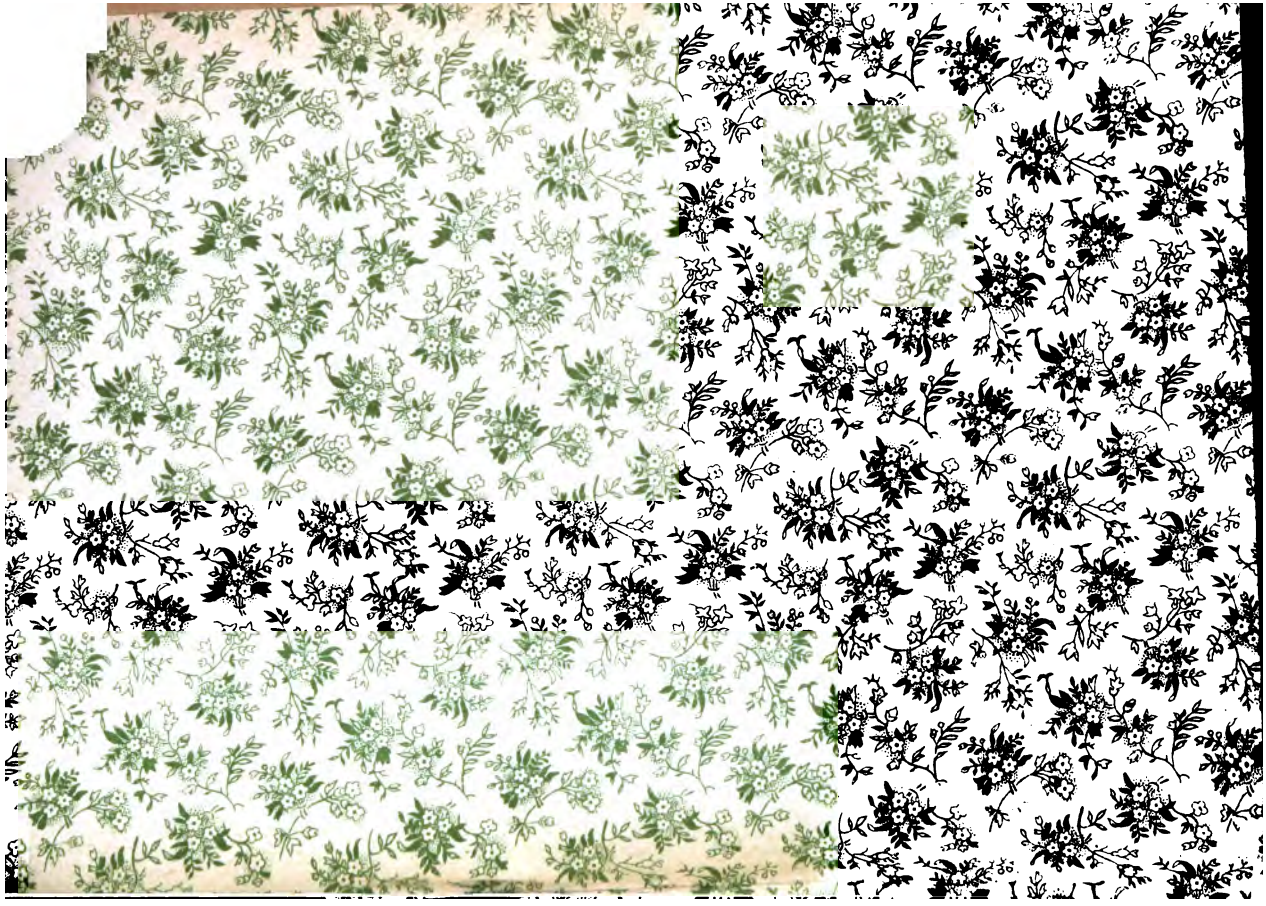

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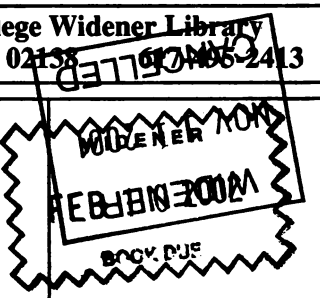

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